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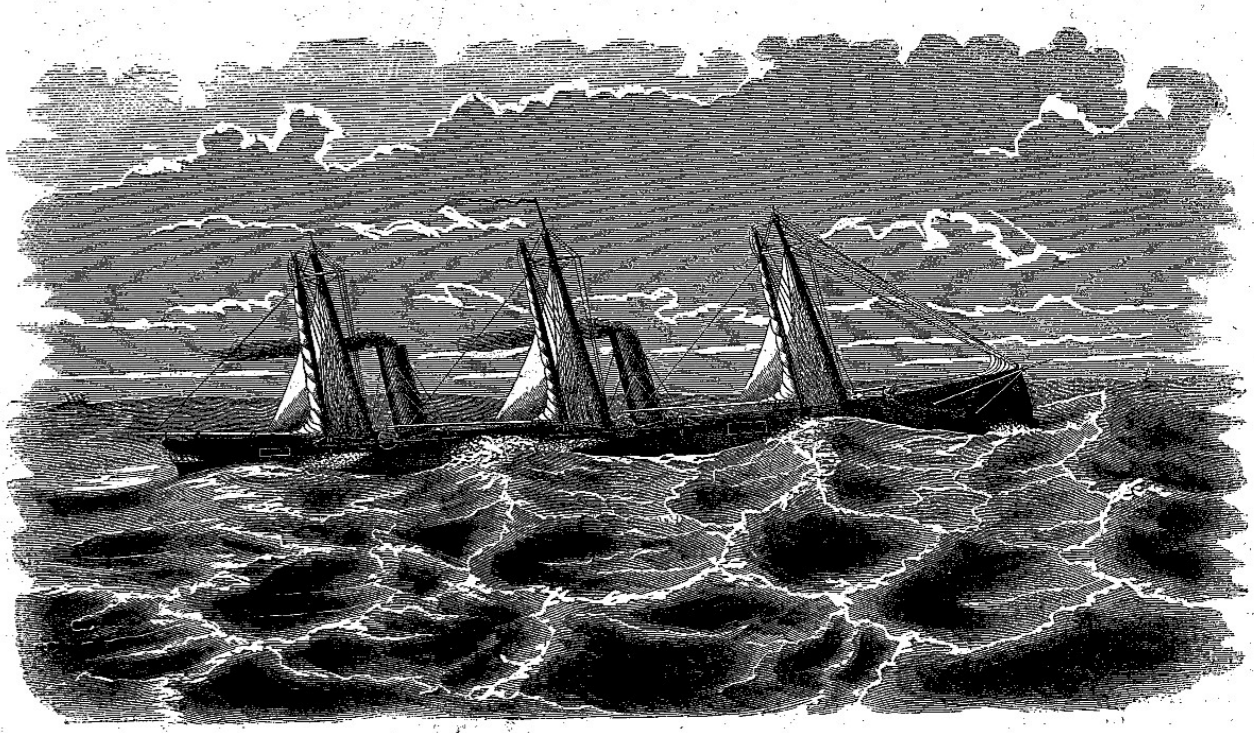
### Composite Ships.

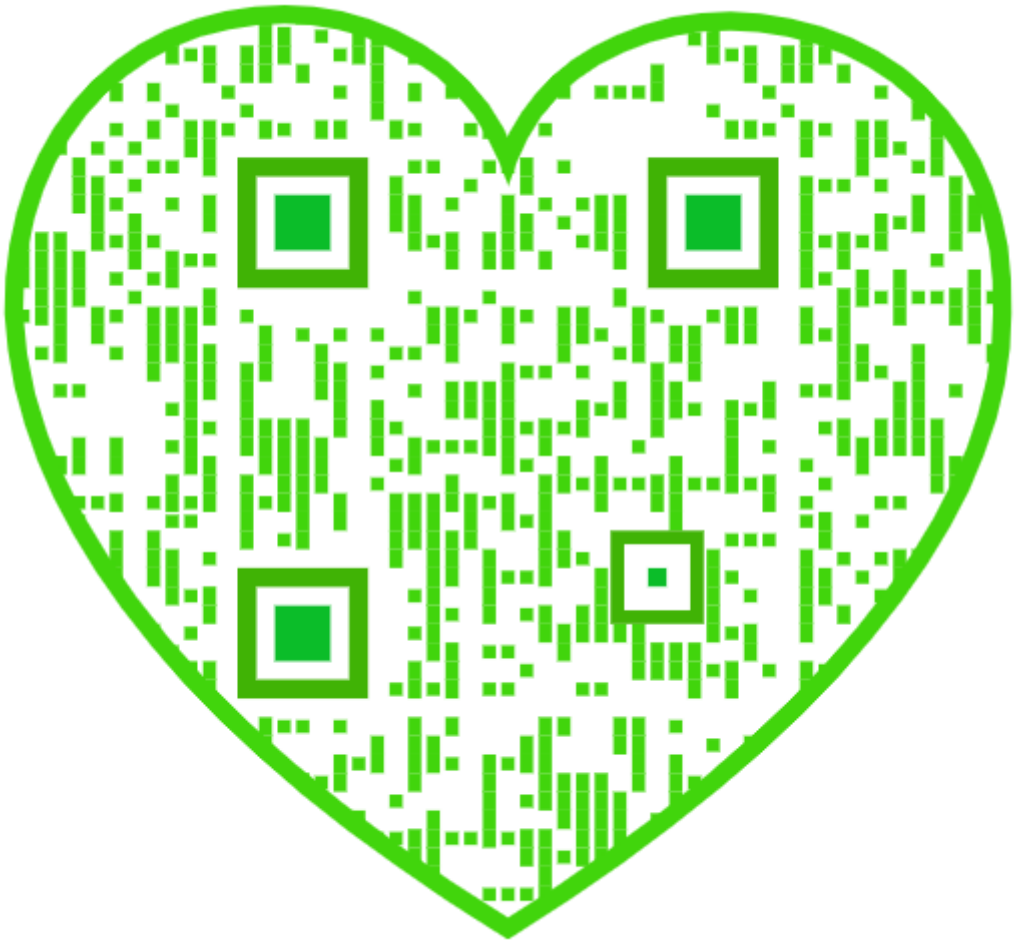
In view of the future for our country, a most important problem is that which has to be solved in the matter of ship-efficiency. It has long been apparent to earnest students that this whole question of ship-efficiency must resolve itself finally into one of speed—highest possible speed at any cost for purposes of war, and the highest speed that will pay, for commercial use. The people, Government or capitalist, having at command this element, speed, in its two phases, absolute and economical, will bid defiance to all comers upon the seas. Excelling speed of ship, in fact, is to be maritime supremacy. Battery, armor, complement of men for war-ships, capacity of hold for merchantmen, subsidies for mail vessels—these are but elements of secondary consideration to successful maritime adventure in the future. Speed will make its commercial voyage unscathed by the enemy's cruisers and running his blockades with impunity, Speed will fight just where, when and how it pleases, or at its own option will decline fighting. Speed will destroy, in quick time, the whole mercantile marine of any enemy that has it not; and speed will transport past, around or through the ocean, lines-of-battle of such an enemy, armies that may seize his depôts and desolate his home ports. The *sine quâ non* of prosperity to a maritime community must be speed in its ships. Wanting speed we are helpless against every foe, false friend and competitor at sea. By what combination of mechanical means, then, shall this supreme efficiency be reached? This is the practical question. And it will be the part of wisdom to bear in mind that whilst expending now, nationally, vast sums for the attainment of effectiveness in less important particulars, this all-important one has not received due attention, either in our navy or our mercantile marine. The iron screw-steamship of the present day is not perfection for our purpose. Steam as a motor for ships and iron as the material for steamships, we fully accept; but here we stop; contending that in the adaptation of form and size to the hull, and especially in the application of motive power to the ship, very much yet remains to be done. Large ocean-going ships, for almost all purposes, must very soon be propelled either fully or in part by steam. On all long voyages and in cruising, economy will be greatly served by the use on steamships of a full sail-power. Then, as a general rule, where absolute high speed under steam has to be attained, ships must have very great length upon a minimum mid-section. This they may have and yet retain sufficient stability for sails, if applied immediately above the hull, of a sufficient power to afford high speed under canvas alone. An inevitable weakness in the consequent form of hull must have its compensation supplied in the strength and disposition of the material used. The model must be of the finest, and the immersed dimensions should coincide closely with those natural to a wave of the velocity required from the ship.

It is not our purpose however, just now, to descant upon the merits of materials or of related form and size in ships. We herewith present illustrations of a ship in which are embodied two remarkable innovations—one in the rig and sails, the other in the means of propulsion by steam. Of the latter we exhibit only the external appearance, with the intent of showing the connection between the two improvements. Our object is to give a full general idea of the improved rigging and sails. The inventor is George T. May, of Tompkinsville, Richmond County, N. Y., and the invention is secured to him by Letters Patent dated respectively April 28, 1857, July 15, 1862, and July 22, 1862. He is the author, also, of the projected mode of propulsion by steam. Mr. May contends—and this view he has repeatedly expressed during the last six years—that the true principle of naval propulsion resides in a harmonized combination of the two motors, steam and the wind; so that both may be applied on the ship to the extent each of a full power, and either be used, as conditions favor or require, independently of the other, and unimpeded by the presence of the other's machinery:—the mechanical requisites for the accomplishment of the object, being, first, a *rig* that would afford an effective sail-power when required, and be easily disposed of when not needed; and, secondly, a *propeller* that would be wholly "featherable" or removable from the water quickly, when not wanted, and be again available for use without loss of time when required.



## MAY'S PATENT RIGGING AND SAILS.

The accompanying illustrations will enable our readers to understand the distinctive characteristics of the improved rig. Some description of the leading points only will be necessary here. In the first illustration a ship is shown as steaming against a head wind and sea, under steadying storm sails and divested of all other canvas and top-hamper. In the second engraving the same ship is shown, with a



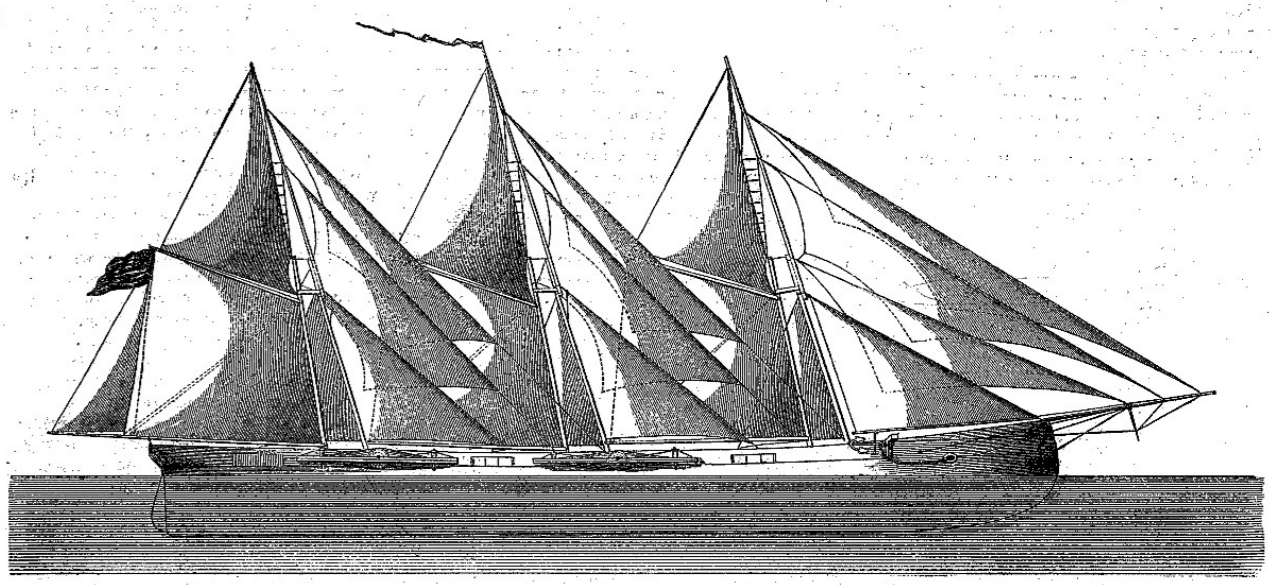
sketch of all the spars and sails in place that can be advantageously set above such a hull. The hull is represented long and sharp, as adapted for highest speed, and fitted with the intermittent propelling device designed for "composite ships." The masts are placed in three pairs or "sets," as they are named in the specification; each composed of its two lower spars or masts and a single upper spar as topmast. The lower masts may be of iron or of wood. Each "set" is independent of the others and wholly self-sustained. The intermediate spaces between the

By means of this arrangement of masts, the unobstructed full sweep of 180° of a circle for each whole wing of canvas is secured; that is, from the right angle on one side of the keel line to fully the right angle on the other side of the keel line. Thus the fore-and-aft sail can be laid right square with a fair wind, and both the risk of gibing as well as the danger from gibing are thereby greatly diminished.

The sails shown in the sketch are twenty in number; each "set"—fore, main and mizzen—being similarly furnished; with some slight difference in

would not exceed what pertains to a like number of studding sails in a square rigged ship. No yards are needed with this rig.

Fig. 3 is an elevation of the improved gaff-sail. It is a trapezium, whose two halves, when formed by a diagonal line drawn fr om the conjugate angles, are triangles—the exact duplicates of each other—so that when the upper half is doubled down on either side, the two halves exactly coincide, forming a reefed sail of just half the size and just double the textile strength of the sail when full set. This mode



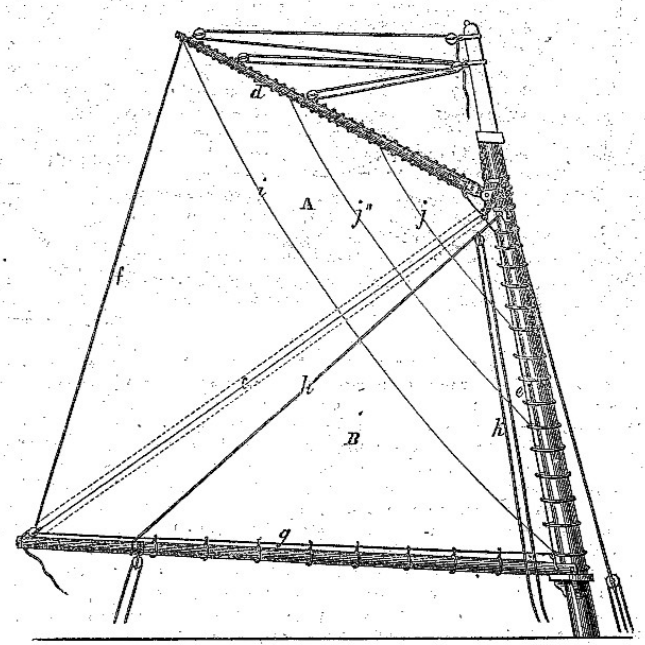
"sets" are entirely unobstructed by standing rigging; the flying stays, on which the intermediate sails are set, being removed along with those sails when they are taken in. These sails are of course to be used only when wind and weather favor; but they will add greatly to the sail-power when conditions are most favorable to sailing the steamship.

Fig. 4 (page 19) is an elevation of the "set," *a* represents the proper lower mast; *b*, the pivot mast; *c*, the bridge; *d* and *e*, the lower rigging; *f*, the topmast; *j* and *k*, the outriggers; *l*, a "traveler" to which the rigging of the topmast is attached; *r* is a step for the heel of the topmast; *s* is the gaff topsail jackstay; *x* is the stormsail, bent to hoops on the proper lower mast; *v* is the gaff-sail bent to hoops on the pivot mast; *t*, the gaff topsail, arranged to be set and taken in from the deck, and *w* is the boom topping lift.

It will be seen that the two lower masts are fitted with a brace or "bridge" just below the eyes of the rigging, which keeps the mastheads at the proper distance apart; the shrouds of the proper lower mast being spread aftward and those of the pivot mast forward. Thus the structure has a much greater rigidity than pertains to the ordinary single mast. One, two or three of these "sets" may be placed upon a hull, according to the length of the vessel. The topmast is of just the length to be lowered into the step on deck without starting the rigging from the uppermost hounds; thus affording the utmost available hight for the spread of light canvas with the greatest facility for immediate disposal of the lofty part of the rig; the "traveler," with the topmast rigging attached, sliding up and down along the top-gallant-mast, as required. Four outriggers from the trestle-trees in place of a "top," afford the necessary spread to the rigging of the upper masts.

the head sails only; and with the introduction of a jib, which, together with the light sails above it, sets to a jib boom fitted to run in-board; also, of a wring-tail to the mizzen. The sails, therefore, appropriate to every "set," are six in number, namely—the storm sail, gaff sail, gaff topsail, stay sail, mid sail, and fly sail. The first is a reserve sail for the purpose implied in its name; the second and third constitute the "plain sail" of the "set;" and under the plain sail of the three "sets," together with the fore-stay sail, which has a foot boom, and the jib, the ship would be worked to windward with the ease of a sloop-rigged yacht. The fourth, fifth and sixth sails comprise the intermediate canvas, for use in part or wholly as opportunity may offer. The labor of operating these last-named sails

FIG. 3.



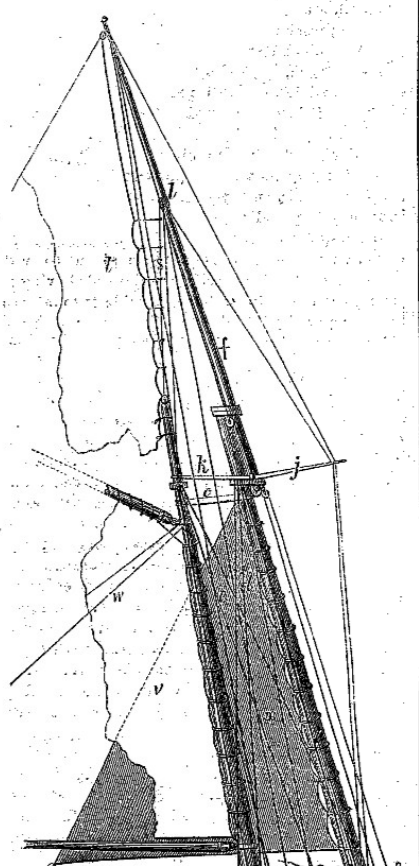

of reefing and furling the sail is probably the most simple and effective ever devised, and obviates one of the greatest objections found to the use of large fore-and-aft sails. A represents the upper half, B, the lower half, *c*, the strain-rope, which becomes a leech-rope to the reefed sail; *d*, the head, and *e*, the luff of the full-set sail, of equal length with each other; the extreme angle of the sail in the throat being slightly pared off, to admit of more smoothly folding down; the after-leech, *f*, and foot, *g*, are also of equal length with each other. Thus the peak of the gaff, when lowered, is brought by the down-haul, *i*, to coincide with the tack of the sail, and being secured there, the sail is reefed. The boom topping lift, *h*, may be overhauled on either side, by an overhauling line, *k*; and the furling will then be effected (so far as reducing the sail is concerned), by letting go the out-haul and brailing into the mast; *j j''*, are the brails. This gaff sail may be set either to a boom in the usual way, or as a "spencer," or with a shortened boom, as may be best practicable for the circumstances of any particular sail. For scudding in a gale, provision is made for reefing the sail in a different way. This improved gaff-sail, though designed especially for steamship use, is applicable to any vessel.

The improved rig and sails may be applied to any long sharp vessel with advantage; but it is in combination with a steam power, either auxiliary or full, that the development of its advantages will best appear. Now in the "composite ship," each power is so placed that it may be employed, either separately and distinctly by itself; or both or all the powers on board may be used together, as required. A near approach to the "composite" character may be had, by the employment of this rig in connection with a lifting screw; and where a light auxiliary steam power only is required and for long voyages, this

combination might be a good one; obviating as it would do, those contradictory mechanics which caused square-rigged auxiliary steamships with uncoupling screws to prove a failure. But for the perfecting of the "composite" character with a full steam power, for an excelling speed, a new instrument of propulsion is demanded. Neither side-wheel nor screw, in any of their variant forms, are adaptable to this use.

The designed instrument of propulsion by steam is a pair of rotating oars with several floats (on the one radius), feathering somewhat after the manner of the buckets of the Morgan wheel, but differently effected. A series of experiments has proven to the inventor that this primitive device of intermittent rotating oars is the preferable one for producing speed-effect; besides the advantage of clearance from the water, simply by stopping the engine at a particular point of any revolution. Each oar is designed to be driven by an independent engine; the two engines of the pair being coupled, for uniformity

Fig. 4.




of effect, by a cam-clutch or its equivalent. Thus any measure of power, from the lightest auxiliary up to the ordinary power of a "full-powered" steamer, may be applied to the one pair of oars. But the known types of the marine engine would be useless for such a purpose. The revolution must be controlled to time throughout that portion of its circuit in which there is no resistance from the water. This is to be effected by "cushioning" in a separate cylinder against either steam or air, the re-expansion of which will operate under modulation, in aid of the following stroke; steam flowing from the boiler only at that portion of the stroke where the resistance has to be encountered. The general plan of the inventor for the accomplishment of this improvement is matured; and applications for patents to cover some of the devices are now pending in the Patent Office.

Mr. May thus offers through the columns of the Scientific American, a broad idea to the public; feeling deeply the importance of that problem in ship-efficiency which has now to be solved; and inviting attention to those features in the "composite ship," as projected by him, which he unegotistically thinks ought to have at this time, a fair consideration from the American people. If, in combination with the improved rig, a steam power can be applied up to the "full power" (as the term is now understood), using the intermittent mode of propulsion, then there is no impediment to placing on our ships double, or approximately double the steam power they now have, by duplicating the boilers, engines and oars, and nothing more; because the three powers in the ship would be wholly non-interfering, and the fuel that was saved, by the use of the unaided sail-power in many days, would go to supply the second set of engines during the hours of emergency when only it would be necessary to use the second power of steam. Thus in a ship-of-war, when necessary to press speed, a velocity of about one-fourth more (if the power be fully doubled) than she could attain by any other means might be had. The results to accrue commercially from the use of an economical speed, derivable through the "composite" system, are as marked as what thus appears to be derivable absolutely.

For further information on the subject of the improved rig and gaff-sail, and on the general subject of "composite ships," address George T. May, Tompkinsville (Staten Island), N. Y.

### The Canal Convention.

The "Chicago Canal Convention," grandiloquently so called, turned out to be a miserable fizzle. The delegates met in Chicago, made some pointless "spread-eagle" speeches and forthwith departed on their way without coming to any decision whatever, except to adjourn immediately, which was acted on without hesitation. The *Merchant's Shipping List* says:—

"To say that we were disappointed in our expectations, in regard to the result of this convention, would scarcely convey an idea of our feelings; and, so far as our observations extend, the same is true of the mercantile public generally. Of course, we cannot say positively, but it is nevertheless fair to presume that it was the object of the convention to induce the Government to father the entire cost of the work on the score of 'military necessity,' and to agitate the subject with a view to preclude the possibility of a second failure in Congress, when it shall come up again next winter. But in whatever manner the project is destined to be engineered or carried out, we shall advocate the project itself on the broad ground of political economy. There can be no doubt that the material prosperity of the country will be greatly enhanced, while in the development of its resources during the succeeding few years, it would be amply compensated for any outlay which the work would involve, apart from any military advantages. Despite the evident short-comings of the Chicago conventionists, we trust the day is not far remote when the Atlantic and great North-west will be bound together still more closely than at present; and we hope, meantime, that the fruits of American enterprise will be retained to American control."

### Green Fruit.

A very unnecessary and foolish practice is observed by market-gardeners and farmers in bringing green fruit and berries to market in advance of the season. Gooseberries and currants as hard as bullets and without any more taste or flavor are retailed at prices far beyond their real value. Fruits in the unripe state are worthless for all culinary and sanitary purposes; they are full of a crude and viscid juice, which is acrid and unpleasant to the last degree, and in a majority of cases is absolutely injurious to persons of weak stomachs. It is only a waste of sugar, time, fuel and money, to use them, and it would be just as sensible to dig up green potatoes of the size of hickory nuts and boil them, or pick peaches when they are just formed, as to eat these currants, grapes and other fruits that are thrown into market to the great damage of the fruit crop and the absolute injury of health and purse. If every one would desist from buying such rubbish the gardeners would cease to send them in, and when the proper time arrived we should have twice as much fruit of a delicious flavor, which would benefit mankind instead of hurting them.

### The Capture of the "Atlanta."

The remark of Captain Webb, of the rebel steamer *Atlanta*, when captured, that the contest would have turned out differently had he not unfortunately run his vessel aground, has much more significance than would at first appear. His words were not mere idle boasting, but were prophetic, or would have been, but for the fifteen-inch shot of the *Weehawken* and the accident previously referred to. The key to the remark is found in the superior speed of the *Atlanta*. Had not this vessel grounded she could have run the *Monitors* down, or have escaped past them with ease, and there are ten chances to one but that she would have been unharmed. Then the career marked out for her by the rebels would have been carried out to the letter. We have no doubt that the blockading squadron off the coast of South Carolina and Georgia would have suffered great damage—much greater than was experienced at the famous raid of the *Merrimac* in Hampton Roads.

We may well thank Commodore Rodgers for his successful shot, and, without cant, attribute our success in destroying this rebel craft to favor from a higher source. The greatest defect of the *Monitors* is that they are too slow. The *Atlanta* came into Port Royal making 8 miles per hour, and could have achieved ten miles, so we are assured, had it been required. The *Monitors* can scarcely stem the tide after they have been at sea six months. No comment is necessary, but we must say in justice that their bottoms are so foul with weeds and barnacles that they are materially incumbered and retarded in their movements. We have been shown aquatic plants over four inches in length taken from these vessels, and we can readily infer that with such a drag upon them, their speed, which is only about 7 miles per hour at the best, is not at all benefited. Is it an utter impossibility to destroy these parasites? We think not. There must be, and there are, resources to draw upon in the arts and sciences which will provide a paint sufficiently noxious to prevent marine plants from clinging to the plating. Why does not some one set to work in earnest to prevent this great evil? Copper paints have been tried abroad but we have never seen any accounts of their indisputable superiority; so have compounds of zinc, but the *Monitors* are now painted with this mineral and the result can be noted above.

The new light-craft *Monitors* now building have much finer lines than the old ones, and give promise of a fair rate of speed; we hope that they will soon be ready to launch, and that meanwhile some person will have discovered and applied a protective coating alike preservative of the iron and the sailing qualities of the vessel which is covered with it.

The Seventeen-year Locusts are up and singing, all the way from Cleveland to the Ohio river at Pomeroy, in a direct South line, 175 miles, extending east into Pennsylvania and westward to the Scioto Valley. The entire region within this limit is not visited, but they appear in spots over that whole breadth of territory.

Flax-dressing Machines.—Persons desiring further information respecting the improved flax-dressing machines described in our last issue, will be furnished with a circular by addressing Mallory & Sandford, No. 26 White street, New York.

A letter from West Point states, as an example of the efficiency of the graduating class of cadets, that they dismount a cannon and separate the parts of the carriage and re-unite them and fire the gun in twenty-six seconds!

At the annual meeting of the Massachusetts Medical Society at Pittsfield, it was stated that of the twenty-three members who had died during the year, one-quarter had given up their lives in the service of their country.

The largest raft of sawed lumber ever run on the Penobscot river recently arrived at Bangor, Maine; it contained 122,862 feet.

The wheat harvest has begun in Illinois. The crop is very heavy and the quality good. Labor is very scarce, and workmen obtain $2 and $3 per day.

Over ten thousand persons have taken the oath of allegiance at Memphis within the last three months.

## A BRIEF HISTORY OF EUROPEAN BANKING.

In these days when the finances of the country are in such a peculiar condition, and when there are so many opinions expressed respecting currency, legal tender and exchange, a brief history of European banking will be of interest to all.

From the New Testament we learn that the Jews were adepts in the art of money-exchanging during the sojourn of the Messiah on earth, just as they are everywhere at the present day. The ancient Greeks being a very active commercial people, Athens became the center of a great maritime trade, and in the time of Solon that city had its money-brokers and a system of marine insurance. The early bankers of Athens were probably Jews, because the primitive Greeks had a strong aversion to money-getting occupations; they looked upon them as beneath the attention of a people who claimed their descent direct from the gods. It is related that these Athenian bankers were of obscure origin, but they gradually attained to a position of great influence in the community, from the wealth which they acquired, as Greece advanced in commercial greatness. With them the practice of taking interest at the time of making a loan originated; this has now become universal in banking transactions under the name of "discount." From Greece the art of banking was carried to Rome, where promissory notes and checks were common in the days of Augustus Cæsar. The first bank, as a special institution, however, is said to have had its origin in Venice, when the citizens of that republic were invited to contribute in support of a war by a loan, each citizen being obliged to advance a portion of his property, for which he was allowed five per cent interest. The revenues of the State were pledged as security, commissioners were appointed to manage the business, and the institution was called the "Chamber of Loans." This chamber became, in 1171, the Bank of Venice, and it continued in existence as a bank of deposit until 1797, when the republic was overthrown by the revolutionary army of France. In 1401, the Bank of Barcelona was instituted and in 1407, the Bank of Genoa. The former loaned as well as borrowed money and was also a bank of deposit, hence it has been considered the parent of modern banks. The republics of Italy were the fountains of modern civilization. Commerce and the fine arts flourished there as they did in the ancient republics of Greece.

In 1609, the Bank of Amsterdam was founded in Holland. It was at first one of deposit only. The Bank of Hamburgh was established in 1619, and its circulation was based upon fine silver in bars. It differs from every other banking institution in the world by receiving and paying out silver and charging a small per-centage for the funds entrusted to it. At the present day it is still in successful operation, enjoying a high reputation.

The next great banking institution was the Bank of England, which was projected and the plan of it laid before the Lord Chancellor of the kingdom by William Paterson, a Scottish merchant. An act of Parliament was passed to legalize it on April 25, 1694, and commissioners were appointed to receive subscriptions to a loan of £1,200,000 to the Government at 8 per cent, the subscribers being incorporated as the Company of the Bank of England. The career of this bank has been very checkered; it has wielded immense power and has been on the whole of vast advantage to England. Its history has been published in a volume of considerable size and it reads like a romance. It enjoys certain privileges, manages the public debt and pays Government annuities. By affording loans to the Government at moderate rates of interest it has saved the nation immense sums, and it has been the means of rescuing it from pecuniary difficulties on several trying occasions. It has had its trials, as during the terrific struggles with Napoleon in 1797 it suspended specie payments by an order of the Privy Council; but in doing so, notice was given that all the notes issued were secure. This suspension, it is said, prevented the ruin of the bank, and it continued until the peace in 1815—a period of eighteen years, and was not fully resumed until 1823. During the wars with Napoleon the Government borrowed £500,000,000, and with only a population of fourteen millions in the two kingdoms and four millions in Ireland, the annual revenue reached the enormous sum of £72,000,000 (about $360,000,000). At the conclusion of those long wars the value of bank paper was 16¾ per cent below that of gold; in two years afterwards it was only 2½ per cent.

In 1844, the charter of the Bank of England was renewed through an act passed under the premiership of Sir Robert Peel, limiting the circulation of its notes to the amount of coin and bullion in its vaults and the amount of its national securities. Every note issued beyond the sum of national securities must have its representative in an equal amount of bullion. The object of this act was to prevent the ever-varying expansion and contraction of issues, but it has failed to effect this object. This bank controls all the others in England, and its notes are legal tender, except to itself. It has a distinct issue department for its notes, kept separate from its banking business; the issues here being equal in amount to the Government debt owned by the bank and the gold and silver in its possession. Its circulation is, therefore, always contracted in proportion as its bullion diminishes; and although this was held by Sir Robert Peel to be a perfect security against financial troubles, it was found to be the reverse in the crisis of 1857, when, during the month of October, the Privy Council permitted the act of 1844 to be suspended and an increase of issues were advantageously allowed.

The Bank of England is the greatest institution of the kind in the world. The whole revenue of the Government soon finds its way into it and is instantly rendered available for the demands of the State. In all these transactions scarcely any metallic currency is used; the whole is effected by purely banking arrangements. The Government collector at Liverpool may require to transmit fifty thousand pounds to London, and some private individual may want to transmit a like amount to Liverpool from London on the same day through the Bank of England or some other bank. Both transactions are carried out by the mere entry in books and the instructions sent by telegraph or post. The revenue is paid into the Bank of England at the rate of over one million pounds weekly; and for all the trouble of managing this business the bank receives no other remuneration than the use of the Government balances, which vary from *nil*, the day after the payment of the dividends, until they accumulate for another payment; when there is not sufficient to pay the Government dividend, the bank is expected to advance the difference, which is paid out of the next accruing revenue. This bank is one of the most convenient, simple and splendid institutions ever devised for managing the finances of a great nation; its affairs have usually been conducted by men of probity and honor. The bank circulation of England, Scotland and Ireland in 1860 amounted to about forty million pounds sterling; the bullion amounted to a little over twenty-two million pounds. It has lately been charged against the management of this bank that it frequently produces great and abrupt changes in the rate of interest, thereby producing extreme fluctuations in mercantile transactions.

The Bank of France was founded in 1716, and it passed through a series of sunshine and reverses until 1803, when it was organized with a capital of 70,000,000 francs. It is a public institution, the chief officers of which are appointed by Government. No bills which have more than three months to run are discounted by it, and all are required to be endorsed by three approved signatures. Its capital is now much greater than when first established, and it occupies nearly the same place in France that the Bank of England does in Great Britain. There are also national banks in Austria, Prussia, Belgium, in several of the German States, Russia, Sweden, Denmark and Turkey.

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Among the recent scientific agricultural suggestions is one for improving chalky soils by using sulphate of iron as a manure. It is stated that just as a preparation of iron is prescribed to the human subject when the blood is poor, so poor and barren soils may be greatly improved by sulphate of iron.

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The tops of pine-apples that are to be kept any length of time should be twisted out, as they destroy the flavor of the fruit by feeding on its juice.

## VALUABLE RECEIPTS.

Case-hardening.—A thin skin of steel is given to forged articles of wrought iron by the process called case-hardening. The old method of case-hardening portions of gun-locks and other articles forged of wrought iron consisted in placing them in a sheet-iron box and surrounding them with a stratum of old shoes, hoofs of animals and bone-dust, and sometimes bone-dust was used alone. The lid of the box was tied down with a wire, luted with clay, then placed in a clear fire and heated to redness as soon as possible, at which temperature it was kept for about an hour. The box was then lifted from the fire and its contents immersed in cold water or oil.

The new method of case-hardening consists in using the prussiate of potash—a salt composed of carbon and nitrogen ($C_2N$). It is employed in a different manner from the old method. The article to be case-hardened is heated in an open fire to a dull red heat, then rubbed upon the prussiate of potash, reduced to powder and placed on the hearth of the furnace, then returned to the fire heated for a few moments and plunged into cold water or oil. Another method, said to be superior to this, consists in applying the prussiate of potash, made into paste with a little starch and water, to the article that is to be case-hardened, then allowing the paste to dry, heating the article to a dull red heat in the fire, then plunging it into oil or cold water. The skin of steel produced upon iron by case-hardening is about $\frac{1}{16}$th of an inch in depth. As nitrogen forms part of all the substances that are employed in case-hardening, it is believed by many persons that its presence is not only required to form steel, but that a small portion of it enters into the composition of steel.

Soda-water.—This is a name given to water charged with carbonic acid gas—the soda having formerly been used in water to enable it to absorb a greater quantity of this gas at ordinary pressures. If a current of carbonic acid gas is passed slowly through soft water, a volume of gas equal to that of the water will be absorbed at the common temperature of the atmosphere. But by means of a force pump the water can be charged with three measures of gas, and this is the way common soda-water, sold as a beverage is charged. It is this gas which gives to champagne wine, ale and soda-water their sparkling property. It is usually obtained by pouring sulphuric acid upon marble dust, which is a carbonate of lime; the sulphuric acid unites with the lime of the marble, forming plaster-of-paris and the carbonic acid gas is set free.

Soda-water Powders.—Put 30 grains of finely-powdered bicarbonate of soda into a blue paper and 25 grains of pulverized tartaric acid into a white paper. This quantity is sufficient for half a pint of water. Dissolve the acid in one tumbler with the least quantity of water and the carbonate of soda in another, add the two together, effervescence immediately ensues, then drink. A pleasant flavor may be communicated to this beverage by adding a small quantity of lemon or other palatable sirup.

Ginger-beer Powders.—These are made exactly like those of soda-water, with the addition of 5 grains of ginger and 60 grains of white sugar to the bicarbonate of soda.

Seidlitz Powders are made like those of soda, with the addition of 100 grains of Rochelle salts to each.

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### Theory of the Cause of Boiler Explosions.

"An examination of considerable interest into the cause of boiler explosions has been made by Mr. Robert Bigby, jr., of Audley, Staffordshire. As the results of his investigations and experience he enunciates the theory that the cause of boilers exploding is the sudden ignition of gases within the boiler. He considers that the manner in which the gases are produced is, that when the water falls below the highest point in the boiler which is acted on by the fire, the plates of the boiler above the water-line become heated, and decompose the steam in contact with them into its component gases, oxygen and hydrogen. These gases, in consequence of their great affinity, being in the exact proportions or quantities to form water, are of a most explosive character, and only require a plate to become red hot, or a communication by a flaw in the boiler with the fire, to ignite them, when a violent explosion takes place by their uniting again to form water. This theory has

the advantage over the others for two reasons:—first, because the only condition requisite to produce these gases is the water getting low in the boiler, which has been invariably the case in all the boiler explosions that have come under his notice; and secondly, because the uniting of these gases in a confined vessel like a boiler will produce results corresponding with those accompanying what are very correctly called boiler explosions. He observes that boilers bursting from an over-pressure and expansion of steam, and boilers exploding, are as distinct as they are different in the effects produced by them—the one merely gives an outlet for the steam and water, the other blows the boiler to pieces and scatters it in all directions."

[The above is from one of our recent exchanges. The theory propounded as to the cause of boiler explosions is not new, and it is not scientific. It is a fact that water, when it comes in contact with red-hot iron, is decomposed, but its two elementary gases (oxygen and hydrogen) do not escape in a state of gas into the boiler. The oxygen unites with the iron which becomes a solid oxide; the hydrogen alone is set free, and it is not explosive. Were the two gases of water set free, and were they mixed together in the boiler, they would cause a terrific explosion when ignited, but since this is not effected by the plates becoming red hot, the above theory is not reliable.—EDS.

## INVENTIONS AND DISCOVERIES ABROAD.

*Non-conducting Compositions.*—For preventing the radiation of heat from steam boilers, cylinders, &c., felting is very generally used, it being a good non-conducting agent. We have also known of plaster mixed with hair, covered with sheet metal, being employed for boilers. A cheap and convenient good non-conductor for such purposes is very desirable; and J. Spence, of the naval dockyard at Portsmouth, England, has lately taken out a patent for such. It consists of 1,000 lbs. by weight of clay made into a pasty consistency with water, 24 lbs. of oil cake, 3 gallons of fish oil, 24 lbs. of cow hair, 24 lbs. of soot and 3 lbs. of bone-dust. These are made into a plastic condition and applied like plaster to walls. This is used for covering boilers. For covering cylinders of engines a few more pounds of oil cake are added and six times the quantity of bone-dust. A primary coating is first put on with a trowel to the depth of three-fourths of an inch; when dry, another coat of the same thickness is laid on and when this dry, it receives a third coat of a composition consisting of 1,000 lbs. of clay, 2 gallons of fish oil, 32 pounds of cow hair, half a gallon of linseed oil, 24 lbs. of ground charcoal, 8 lbs. of melted glue, and 8 lbs. of any desirable paint. This non-conducting cement may be bonded and covered with wood laths, on boilers and cylinders, while steam pipes may be covered with bands of straw saturated in the composition.

*Indian Shawls.*—A patent has been taken out by P. F. C. Cheverton & E. C. Echenberg, in England, for manufacturing India shawls and carpets and other descriptions of figured fabrics in looms, producing the "crochetage" by machinery, which has hitherto been executed by hand in India. In accomplishing this object, they dispense with the shuttle, and substitute for it needles and hooks. This hint may be useful to some of our manufacturers of carpets and fancy kerseymeres. The manufacture of fine harness shawls, like those made in France and Scotland, so far as we know, has not yet been entered upon in our country.

*Deodorizing Petroleum and Mineral Oils.*—A patent has been taken out by J. Moule, chemist, London, for the employment of deutoxide or nitrous gas in removing the offensive odor of petroleum and other mineral oils. One mode of procuring this gas is by using nitric or fuming nitrous acid in combination with shreds of iron, copper or other metal. The nitrous gas thus formed is conducted from the outlet, by means of a pipe or tube, into a vessel charged with petroleum to be deodorized, in such a way that this pipe or tube reaches to the bottom of the vessel, thus allowing the nitrous gas to force its way through the whole of the contents. The gas is continued to be generated and forced therein, until fumes of nitrous gas begin freely to escape from the petroleum or oil, thereby indicating its complete saturation. As soon as this has taken place, the whole is to be well roused by forcing air through the liquid, or by a suitable agitation, after which the vessel containing the liquid petroleum or oil is to be closed until, by testing, the petroleum or products thereof are found free from any disagreeable odor, the time for which will be in proportion to the amount of gas generated and forced therein. Should the temperature be so low as to render the petroleum thick, it should be heated to a temperature of 100° Fah., and by thus liquefying it the deodorization will be more quickly and easily effected. Another modification of this deodorizing process is to pass the nitrous gas during the distillation of petroleum into the upper part of the still, so as to bring the nitrous gas into contact with the vapors arising therefrom. The gas for this purpose is collected in a suitable gasholder, and by pressure forced into contact with the petroleum vapors, the proportion of gas being regulated by a suitable stop-cock. The nitrous gas in this process may also be used in combination with ordinary or superheated steam, if thought more desirable. As it may be found convenient to effect the deodorization of the crude petroleum in the casks, other means are made use of as follows:—Into a cask, the contents of which are about 40 gallons, there are poured three or four pounds of nitric or fuming nitrous acid, and the contents thoroughly roused by means of a suitable agitation, or by forcing air through a pipe to the bottom of the cask. After rousing the contents for about five minutes, there is thrust into the cask containing the petroleum and acid about two pounds of scraps or filings of iron, which should be previously moistened with water. The iron coming in contact with the acid, nitrous gas is generated and, by saturating the petroleum, deodorization is effected. Should the deodorization be not thoroughly complete, the contents are again roused, more acid and iron being added until the object is accomplished. The petroleum or other products, while being subjected to the above treatment, and previous to distillation, should have the acid wholly removed or neutralized by decantation and washing with suitable alkaline substances, or by the addition and subsequent agitation of fresh slacked lime, in the proportion of 6 lbs. of lime to 40 gallons of petroleum. After distillation, the oil is sometimes again submitted to the action of nitrous gas.

*Testing the Explosibility of Petroleum.*—E. A. L. Negretti & J. Warren, makers of meteorological instruments, London, have obtained a patent for an apparatus to ascertain the temperature at which liquid hydro-carbons produce an explosive mixture or gases, and also the temperature at which such liquid hydro-carbons will be ignited by the contact of flame. The apparatus consists of a thermometer, the bulb of which is made to dip into a cup or vessel in which the hydro-carbon to be tested is placed, and is heated by a spirit-lamp or water-bath beneath. Upon the hydro-carbon being heated, it will give off vapor in proportion to its volatility and the amount of heat employed, and this vapor, upon being allowed to mix with a certain proportion of air in a suitable chamber or vessel, will form an explosive compound. Upon introducing a flame into the chamber or vessel where the mixed gases are, a slight explosion will take place if the proper proportions of gases are present. After the first explosion, the exact time required for evolving a sufficient quantity of vapor to produce a second explosion must be noted. The temperature of the hydro-carbon must also be ascertained by referring to the thermometer. By this means the lowest temperature at which the hydro-carbons will form an explosive compound will be indicated by the thermometer. In order to ascertain the temperature at which the liquid will ignite by contact with the flame, it will only be necessary to remove the cover from the vessel containing the oil and then applying a lighted paper from time to time while the temperature of the oil is being gradually raised. This is similar to Giuseppe Tagliabue's apparatus, illustrated on page 184, Vol. VII. (new series) of the SCIENTIFIC AMERICAN, and patented Oct. 28, 1862.

*Polishing Sheet Iron.*—B. Lauth, of Reischoffen, France, has taken out a patent for polishing sheet iron with rollers. Three rollers are mounted in a frame and placed above one another, their axes being horizontal and paralell. The upper and lower rollers are of equal diameter; but the intermediate roller, which works in contact with the other two, is of smaller diameter. The sheet of iron passed between any two of these rollers under pressure, receives a beautiful lustre. As one of the rollers is of less diameter than the others, the sheet of metal is subjected to a drawing and pressing action, and thus acquires a superior polished surface.

*Night Signals.*—A lecture was lately delivered by Lieutenant Colomb, at the Royal United Service Institution, London, on a new apparatus and mode of signalling by light. The signals are transmitted by flashes of white light of short and long duration, the tables of flashes corresponding with the numerals 1 to 10, 1 being represented by a short flash of light, and each number up to 5 by a similar number of short flashes. "Six" is indicated by one long flash, 7 by one long and one short, and by further combinations each letter of the alphabet is represented. The apparatus by which these signals are produced, consists of a shaded lamp and the signal-box, the latter being fitted with a drum and table. The drum, the surface of which is mounted with a series of pins and bars, on being turned by a handle, raises the shade by means of connecting line and lever, so as to produce the required flashes indicated on the table. The process is very simple, but very perfect. Another important feature connected with the invention is, that it can, in the event of a fog, be attached to a steamship's whistle, and worked with the same result by sounds of greater or longer duration.

### Dangerous Coin in Circulation.

In consequence of the absence of gold, opportunity has been afforded experts to manufacture large quantities of "filled" coin, which is said to be pretty well circulated in this and other cities. The resumption of payment of custom duties in gold, in consequence of the scarcity of the demand notes, has brought out the false coin in company with the genuine; and the counterfeits are so well made that none but experts can detect them. We are informed that many of the banks have received and paid this false issue; brokers take and sell it, and it is sent to the Custom-house to pay duties, without criminal knowledge or intent. The proportion of the filled coin now in use is not large, as compared with the genuine currency, but it is nevertheless true that few of the men handling it know whether the coin is genuine or not, and the uninitiated cannot possibly detect the work of the tamperers.

At the Custom-house, the filled pieces are sent in for payment of duties, while the rejection of a number of them in one day is not uncommon. The discovery of these pieces is followed immediately by cutting them in halves with a chisel, when they are returned to their owners, who, of course, replace them with good coin.

The system of filling, as now practiced, is said to have originated some years ago in California, and was first detected in England in the process of melting the coin. The business is now, if possible, more carefully, and also more extensively conducted. The process is to split the coin, to take from the center one-third to one-half, and, in some cases, a larger proportion of the gold, which is carefully weighed, and an equal amount of platina, or alloy of platina, of an inferior quality, put in its place—in what manner is not precisely understood. The sides of the coin are then closed, the edge is remilled, and the whole of the work is so accurately done that not only the weight of the piece remains unchanged, but the size remains the same or so nearly the same that the difference is not perceptible; and what is most singular, the "ring" is perfectly clear. This test, therefore, which is generally employed to detect spurious coin is quite useless, although some experts think they can by this means observe and detect the filled pieces. The milling of the coin most frequently reveals its character.

At the present rate of premium, six to seven dollars' worth of gold can be taken from a ten-dollar piece, while the filling is estimated to be worth four dollars per ounce—one-fifth, perhaps, of the metal abstracted.

The skill with which the fraud is committed constitutes its chief danger; but it is by no means likely that any large proportion of our gold coin will be thus debased.—*Philadelphia Press.*

## Correspondence

### Modes of rifling Fire-arms.

MESSRS. EDITORS:—Among the various notices of improved fire-arms which have appeared in your paper, I have not seen any mention made of Atwater's new system of rifling as applied either to muskets or cannon. The theory of this method of rifling is that you get in the ordinary rifle or musket the full explosive power of the powder at a distance of 8 or 10 inches from the breech, and that if you can at that point relieve the ball or projectile from a portion of the pressure of the atmosphere in the barrel, you can attain a much higher velocity. To attain this result Mr. Atwater commences with six grooves at the breech, discontinuing three of them at a distance of 8 or 10 inches, from which point but three grooves are carried out to the muzzle, and those three grooves are cut much deeper than the six, affording an opportunity for a portion of the air to escape around and behind the projectile, and thereby relieving it from the pressure or *vis inertia* of the column in front, which at its greatest point is estimated at 30,000 lbs. to the square inch. In a trial of a rifle of this kind made in Chicago last October, at which I was present—and to the result of which I can testify—at 100 feet distance a conical ball (weighing about 60 to the pound) penetrated 26 inches of pine, passing entirely through, and buried itself to half its depth in the fence behind. It also penetrated ½ of an inch of boiler iron of good quality. I think such results have not before been obtained, except perhaps by the accelerating rifle which is somewhat complicated as well as dangerous. In a conversation with Mr. Horace Cleveland (who wrote several articles on the rifle, which appeared in the *Atlantic Monthly* last fall, and who also delivered a course of lectures in Boston on the same subject), he informed me that the greatest penetration obtained by any of the rifles in use in the military service of this or any other country, which had come to his knowledge, was 13 inches. The Atwater patent rifle gives 26 inches, as herefore stated doubling the penetration of any other. This method of rifling would apply to all the guns in the army now in use, the expense of alteration being but trifling. The same system of rifling is applicable to ordnance, and a large cannon made by Alger of Boston, is now on trial in Washington, and has thus far eclipsed in its results any other cannon known, at least so far as its range is concerned, and that of course includes its crushing or penetrating power. G. M. H.

Cincinnati, Ohio, July 1, 1863.

### Olfactory Organs of Buzzards—Carnivorous Bull-frogs.

MESSRS. EDITORS:—On page 391, Vol. VIII. (new series) of the SCIENTIFIC AMERICAN, I find an article condensed from the *American Journal of Science and Arts*, ascribing to the buzzard the ability of detecting the location of yellow fever through the keenness of its smell. Nothing can be more erroneous; the buzzard has comparatively—in sportsman's phrase—no nose, and it cannot detect carrion in any stage of putrescence four rods off. The bird relies solely on its sight—which is wonderfully far-reaching—to find its game. The late Mr. Audubon has, however, so well refuted this theory of the bird's "smelling powers" in his numerous experiments with the carcases of dead horses and bovines, that I refer you to his small volumes accompanying his fine work, "The Birds of America," as being more conclusive than anything I can say upon the subject, and there leave Major Hunt and his theory.

Your Missouri correspondent's assertion that the bull-frog of our Western waters "is carnivorous" you seem to doubt. This class of frog is hardly anything else than what your St. Joseph correspondent describes. In their season he feeds mostly on the young of the wild duck, taking them from under while alive and swallowing them at a gulp. It is wonderfully voracious, and sometimes seizes a full grown live duck, and fights most lustily to destroy it; I have often found full-grown young blackbirds with all the feathers on in its stomach, as well as water-snakes of good size, and the young of the wild duck. The powers of its stomach to expand are enormous. It will almost swallow whole a full grown mallard duck, and does with ease take in a teal. I have lain hid for hours in the cane-brakes lining our stagnant streams and ponds, and watched this gentleman's mode of procuring his supplies, and have opened the stomachs of many of them, but never found anything of a vegetable nature therein.

HENRY CHITTENDEN.

Chittenden's Bridge (Calumet), Ill., June 30, 1863.

## SHIP-BUILDING IN PHILADELPHIA.

There is great activity manifested in the ship-yards and machine-shops of Philadelphia. It is true that the prominent features of the work in progress comprise the construction, refitting, and repairing of vessels-of-war for our Government, demanded by the exigencies of the times; but they do not monopolize the whole of it, as within a few weeks past the following first-class steamers for private parties have been finished and are now in operation on their respective routes; others are now on the stocks or undergoing the process of completion:—

THE STEAMER "THOMAS A. SCOTT."

Hull built by Messrs. Wm. Cramp & Son; machinery constructed by Messrs. Neafie & Levy; owners, Henry Simond & Co.

Length of hull on deck, 216 feet 10 inches; breadth of beam, 31 feet 9 inches; depth of hold, 10 feet; depth to spar deck, 18 feet; draft of water at load line, 12 feet; tunnage, 1,056 tuns. The frames are of white oak, chestnut, &c., and square fastened in the most approved manner with copper and treenails; they are filled in solid under engine and boilor, and have iron straps 4½ by ⅝ inches extending around them. The floors are molded 14 inches, sided 8 inches, and the frames are 25 inches apart at centers. Her rig is that of a schooner. The engines are vertical direct-acting; one cylinder 42 inches in diameter, having a stroke of piston of 3 feet. There is one tubular boiler located in the hold. Diameter of propeller, 10 feet 6 inches; material, cast-iron.

THE STEAMER "JOHN RICE."

Hull built by Messrs. Wm. Cramp & Son; machinery constructed by Messrs. Neafie & Levy; owners, Henry Simond & Co.

Length of hull on deck, 175 feet; breadth of beam, 30 feet; depth of hold, 11 feet; depth to spar deck, 19 feet; draft of water at load line, 8 feet; tunnage, 785 tuns. Frames of white oak, hacmetac, &c., and square fastened with copper and treenails; they are filled in solid under engine, and have iron straps double and diagonally laid, 3½ by ⅝ inches, running around them. Floors molded 13 inches, sided 7 inches, and the frames are 24 inches apart at centers. Her rig is that of a schooner. The engines are vertical direct-acting; one cylinder 40 inches in diameter, and 3 feet stroke of piston. There are two tubular boilers located in the hold. Diameter of propeller, 10 feet; material, cast-iron.

THE STEAMER "NORMAN."

Hull built by Mr. John W. Lynn; machinery constructed by Messrs Neafie & Levy; owners, H. Winsor and others.

Length of hull on deck, 236 feet; breadth of beam, 34 feet; depth of hold, 18 feet 6 inches; depth to spar deck, 26 feet 6 inches; draft of water at load line, 16 feet 6 inches; tunnage, 1,312 tuns. Frames of white oak and chestnut, square fastened with copper and treenails in the most approved manner; they are filled in solid under engine and boilers, and have iron straps double and diagonally laid, 3½ by ⅝ inches, extending around them, making them very staunch. Floors molded 14 inches, sided 9 and 12 inches, and the frames are 28 inches apart at centers. Her rig is that of a brigantine. The engines are vertical direct-acting; one cylinder 58 inches in diameter, and 4 feet stroke of piston. There are two tubular boilers located in the hold. Diameter of propeller, 14 feet; material, cast-iron.

THE STEAMER "TONAWANDA."

Hull built by Messrs. Wm. Cramp & Son; machinery constructed by Messrs. Reany, Son & Archbold; owners, S. Flanagan and others.

Length of hull on deck, 175 feet; breadth of beam, 30 feet; depth of hold, 11 feet; depth to spar deck, 19 feet; draft of water at load line, 8 feet; tunnage, 785 tuns. Frames of white oak, hacmetac, &c., and square fastened with copper and treenails; they are filled in solid under engine, and have iron straps 3½ by ⅝ inches, running around them. Floors molded 13 inches, sided 7 inches, and the frames are 24 inches apart at centers. Her rig is that of a three-masted schooner. The engines are vertical direct-acting; one cylinder 40 inches in diameter, and a stroke of piston of 2 feet 6 inches. There are two tubular boilers located in the hold. Diameter of propeller, 10 feet 6 inches; material, cast-iron.

The above described vessels are constructed of the best materials, possess extraordinary strength, and are of handsome models.

### A Dangerous Precedent.

It is but a short time since we warned the naval authorities that after the safe was stolen from the Brooklyn Navy-yard, it behooved them to keep a sharp look out on the gunboats, or else some thief would steal into the docks some night and appropriate them also. Our predictions have been verified, and the recent attempt of the rebels to steal the revenue cutter, *Caleb Cushing*, off Portland, though only a partial success, was one of the boldest feats of the war. We heard that an individual (who had rather confused ideas about the rights of other persons) once stole a saw-mill, and would have escaped with it, but for his desire to carry the mill-dam away also; the seizure of the revenue cutter is analogous, and was rather too large an undertaking for the number of rebel pirates engaged in the transaction. The plan was audacious, and was only frustrated by the prompt action of the Portland people; with an energy that stands out in strong relief against the apathy manifested by another State when her borders were invaded, the Portland authorities armed and manned two steamers with a crowd of eager volunteers and boldly engaged the captured cutter where they found her, and brought all the crew ashore, sinking the cutter in the attack. The audacity of the enemy was fully met by that of the people of Maine, and they have shown the pirates that they are likely to receive a little more than "tit for tat," when they encroach too far. Mr. Lieut. Reed's ambition to enact the part of Paul Jones was suddenly nipped in the bud by the prompt action of those in charge of the steamers; but for them the *Caleb Cushing* would now be on the high sea, plundering and burning all vessels in her path. We hope a good watch is kept over Forts Lafayette and Hamilton; the aspect matters are assuming, at present, renders it not at all improbable that the rebels will bring up a tug-boat and attempt to tow them out of the harbor, and thus liberate all the prisoners confined in the former. Are the sentries vigilant and trustworthy?

### A Great Water Tunnel.

The Board of Public Works of the city of Chicago have taken the first steps towards the construction of a tunnel two miles out into Lake Michigan, to supply the city with pure water. The proposed tunnel will be five feet in diameter on the inside of the wall, and will require two years in construction. Four hollow cylinders will be sunk in the lake at a distance of half a mile apart, the lower end penetrating the bed of the lake to the level of the proposed tunnel, and from these shafts the tunnel will be dug in two directions, and also pushed as rapidly as possible from the shore. All these cylinders will be closed after the completion of the tunnel and will be removed to such a depth as not to interfere with navigation, with the exception of the outside one, which will be constructed with reference to its becoming the inlet for the water or gate chamber, and perhaps be surmounted with a small light house; and so arranged that the water can be shut off from the tunnel. The cost of the tunnel will only be $307,552, and it is supposed by the Board that, if the tunnel is constructed, there will be no necessity for building new pumping works, as it will be constructed opposite the old works.

THE commerce of the world requires 3,600,000 of able-bodied men to be constantly traversing the sea; of this number, probably 7,500 die every year. The amount of property annually moved on the water is from fifteen hundred to two thousand millions of dollars; and the amount lost by the casualties of the sea averages twenty-five millions of dollars.

### How to make Medicine palatable to Children.

The Philadelphia "Medical and Surgical Reporter" says:—"The rod is now but seldom resorted to as a means of family discipline among the intelligent and refined; hapily it is fast giving way to a mild and more effectual government by reason and the affections. With this relic of barbarism should we not associate that method of punishment practiced on the children of former generations, and many in our own, compelling them to atone for the *crime* of being sick by the involuntary penance of taking disgusting physic? I think that life has so many necessary pains and penalties, that a sound philosophy looks to removing all avoidable ones, especially during that period in which life is normally joyous, and in which perfect development is so dependent on this very condition of the mind. He who would purposely cloud the sunshine of youth must be not only a cynical philosopher, but a poor physiologist.

"Who has not met with instances of intelligent people, as the world goes, who, while they resort to a skilled physician to relieve their own ailments, take into their confidence some skillful homœopath every time one of the children needs medical treatment? And these unsophisticated parents will tell you that they prefer their old family physician, whose judgment they have long tested, and whose experience fits him to be a wise counselor, but they 'can't get the children to take his medicines.' It may do very well to sneer at this sort of argument, but whoever has seen the popular illustration (perhaps originally from *Punch*) of that very impassioned representative of free institutions, 'Young America,' will understand the trouble he makes when his nurse comes about with the castor-oil bottle, or tries the persuasive argument of turpentine or worm tea. Then, again, the deception practiced, almost necessarily, upon children, to inveigle them into taking the nauseous doses prescribed for them, is deplorable to contemplate in view of the aptness of human nature to follow the example of the Arch deceiver or of those who lend themselves to his arts. It is well the physician does not always bear a share in the accountability which must attach to this moral aspect of the subject.

In the choice of remedies bitterness is a great objection to a medicine for children; yet, unfortunately, the most important of tonic remedies, sulphate of quinia, is remarkable for its intense bitter taste. Saline and alkaline tastes are offensive to children, and hence for antacid purposes we may make choice of chalk or magnesia, the former checking and the latter promoting the action of the bowels, both being insoluble and tasteless; the chief point to be attained, especially in the case of magnesia, is to select a perfectly smooth, not gritty preparation, such as Husband's or Henry's; given in milk, these are scarcely observed by children. For infants, whose sense of taste is but little developed, bicarbonate of soda may be given in solution in mint-water, the proportion being usually half a drachm to four fluid ounces; dose, a teaspoonful—a very simple substitute for the numerous so-called carminatives, containing opium, peppermint, camphor, and other powerful medicines. For adults I should make choice of bicarbonate of potassa in place of the corresponding soda salt, and I know of no objection to this substitution, for children; it certainly secures greater efficiency, uniformity, and without much increase of taste. Saline cathartics are not generally relished by children, Epsom salts especially. We have an agreeable substitute for this in solution of citrate of magnesia. Cream of tartar is a rather pleasant cathartic, which, made into a kind of lemonade, will generally be taken without any difficulty. Children do not generally enjoy Seidlitz powders as some adults do.

"Castor oil is a remedy of such rare good qualities that it seems difficult to substitute anything for it; but some adults would rather take the risk of a fatal termination of their sickness than resort to this nauseous medicine. Some little patients early learn to swallow a pill, and when this is the case we have a chance to avoid the difficulty in question, but many children do not acquire this art, and we may then choose between powders and liquid forms; powders are only allowable when the ingredients are nearly tasteless, or may be disguised by sugar.

"Oils, from their power of resisting admixture with water, can be floated down the throat with very little contact; but mixed with gum, the emulsion is readily miscible with the saliva, and its taste is realized to the full. Few children, however, are affected by the unpleasant taste of an oil if sufficient sugar is mixed with it. In emulsion—in fact the key to the preparation of medicines for children is found in the free use of sugar—a candy can be made with castor oil instead of butter, which will be acceptable to children generally. Lozenges of any tasteless or insoluble substances will be taken with avidity. This is an especially good way of giving precipitated carbonate of iron, a good common chalybeate for children. I have dispensed thousands of boxes of iron lozenges, composed of 5 grains of precipitated carbonate with 15 grains of sugar, flavored with vanilla. For adults I have used Quevenne's metallic iron, which is not so tasteless, and to be agreeable requires disguising with chocolate. The ferruginous chocolate drops contain one grain each of the official *ferri pulvis*.

"Astringency, which is akin to bitterness, may be overcome pretty well by combining with plenty of sugar and suitable flavors. The astringent roseleaf, tablets and pastilles of chlorate of potassa, though less adapted to children than adults, are sometimes used instead of liquid forms. Citrate of potassa may be nicely given in lozenges.

"Laxative lozenges may be easily made by the use of a little podophyllin, combined with cream of tartar and a suitable flavoring ingredient; or confection of senna, if a good article is within reach, will furnish an agreeable laxative."

### The Value of Confederate Money.

When the rebel steamer *Calypso* was captured by the United States steamer *Florida*, while on her way from Nassau to a port in North Carolina, a mail-bag was found on board from which the following letter was taken. It was written by J. B. Jaques to his firm in Columbus, Georgia. He says among other things:—

If I am not mistaken some of the blockade-runners will lose a pile of money, as Confederate money is becoming at such a discount they cannot get price enough on the goods to pay the difference of exchange, as all goods have to be paid for in gold or sterling exchange, and all freights prepaid, and then take all chances of getting them through, besides paying duties on them at Charleston. Some of the blockade men here think the next steamer from Dixie will bring bad news, and there will be a much greater discount on Confederate money—say seven or eight hundred dollars for one hundred in gold; and my opinion is it will soon be worthless. Yesterday I bought here (Nassau) five hundred dollars in Confederate money at four cents on the dollar, and some was sold here for even a greater discount. So you can see what the people here think of Dixie money, and in fact no one here will take it at any price for goods or for freight money; and if I had a million of gold dollars I would not invest one dollar here and take the chances of getting through and take Confederate money. If you have any Confederate money on hand when you receive this, get clear of it on the best terms you possibly can, and in future do not take any more Confederate money only at what you can sell it for gold, and turn it into gold as soon as you receive it. The best investment of Confederate money is good sterling exchange, the next is gold or silver and the next is cotton, for sooner or later, I am confident, Confederate money will not be worth the paper it is made on, although I may be mistaken.

This is the testimony of a rebel merchant, whose exodus from the South seems to have opened his eyes to the hopelessness of the rebellion. According to his statements, Confederate money is already at such a fearful discount that the English merchants of Nassau, favorable as they are to the rebels, refuse to have anything to do with it. One of the strong hopes we have of the success of the Federal cause is that our financial strength is far greater than that of the Confederates. In fact they virtually admit that their debt is now larger than ours, and it is certain that our ability to pay is more than treble theirs.

### Transplanting Large Trees.

The system of transplanting large trees has been practiced in Paris during the past few years to an extent unknown elsewhere. In spring and autumn the transplanting trucks or wheeled frames are to be seen in all directions, and the Champs Elysées, the Boulevards and the various squares recently laid out in many parts of the town, have been adorned with thousands of noble trees by these means. A report has been made on the subject to the Central Society of Horticulture, by which we are informed that horse-chestnut trees, more than 39 inches in diameter, and a catalpa tree, 150 years old and 23 inches in diameter, have been transplanted with success. Another and very remarkable case is mentioned, namely, that of three good-sized trees growing in such a manner that they could not be separated, having been removed together from a private garden about to be destroyed; the mass of roots and earth measuring about 16 feet in length. It has been discovered that the bleeding of trees and the attacks of insects, after the cutting-off of branches, may be stopped by the simple method of brushing the part exposed with a paste made of wood-ashes and water; the ashes enter between the fibers of the wood and prevent exudation, while the alkaline property of the mixture keeps off insects.

### Manufacturing Items.

Sharp's rifle factory, Hartford, Conn., is to be enlarged again by the building of a wing running west from the main building, 215 feet long and 45 feet wide, and three stories high, exclusive of attic and basement—equal to five stories in all. The building is to be filled with machinery for manufacturing Sharp's rifles and carbines, driven by a new beam engine of 150-horse power. About 450 men are now employed at the rifle factory, besides 10 men and 50 girls at the cartridge works. The company is exclusively engaged in the manufacture of Sharp's carbines, and the works are run night and day, turning out about 600 weapons per week.

The Lewiston (Maine) Manufacturing Co. have worked up, during the past year, about 190,000 lbs. of wool; they have made 181,000 yards of fine indigo blue blouse flannels, also 74,597 yards of sky-blue kerseys, and nearly all are sold. They use fine wool for flannels and good strong wool for kerseys. The company paid out, during the past year, about $16,000 for indigo, using only the best Bengal.

During the past six months a larger business was done at the Pembroke (Maine) Iron Works than for any previous half year since they were in operation. They now employ 425 men, and are kept going during night and day. The proprietors are making sundry improvements which will afford opportunity for carrying on the works on a larger scale.

The large quantity of 4,466 feet of inch-lumber has been sawed by one saw in 57 minutes, at Jerome & Taylor's mill in Saginaw, Michigan. The lumber was edged and ready for market at the end of that time. The logs were not peeled but taken directly from the boom.

A flax mill will soon be erected in Hillsdale, Mich., or at least in some place in that region, and some of the machinery put in operation in time to dress the flax that shall be raised this season in that vicinity.

A flax-cotton manufacturing company has been organized in Oswego, N. Y. It occupies a stone building 140 feet long, five stories high. Fifty looms for flour-sack sheetings are ready for operation.

In Allegheny, Pa, the extensive steel works of Messrs. Hartman & Reiter are now almost ready for operation.

The Rensselaer Iron-works Company, of Troy, N. Y., one of the largest establishments in the country for rolling railway iron, are soon to enlarge and improve their present works.

In Woonsocket, R. I., the woolen mills continue to run full time, and the cotton mills half time. Considerable building is going on and the price of real estate has recently greatly advanced.

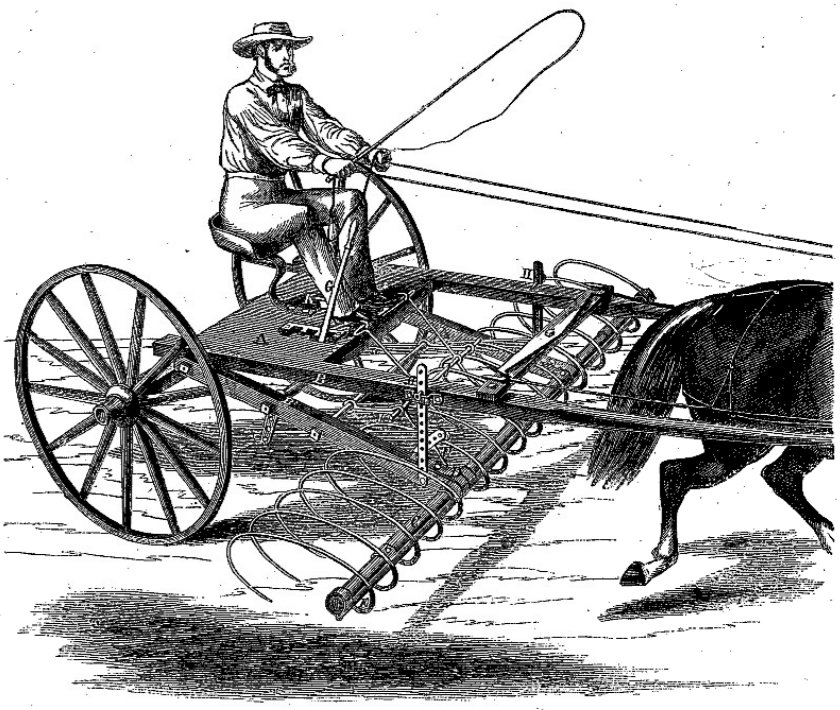
The Bigelow Carpet Company are erecting at Clinton, Mass., a large dye and dry house, and the Wire Cloth Company, in the same place, are building an addition to their works, 150 feet in length.

SAPIENT CONCLUSION.—The following sentence is taken from a letter in one of the daily papers commenting upon the loss of the gunboat *Sumter*, "The captain's principal fear was that the water might carry some of the hot coals from the boiler into communication with the magazine," &c. Between the water, the hot coals and the powder, dreadful consequences would doubtless have ensued.

A PIECE of bread soaked in vinegar and applied to a corn on the foot, going to bed at night, and bound with a piece of oil-cloth, will remove the corn in two or three applications.

### The "Buckeye" Hay-rake and Cocker.

Herewith we illustrate a very complete and thoroughly-made machine for the purpose of raking hay. We have so often dilated upon the monotony and hard labor attending this portion of the duties of the farmer that we shall omit further comment upon the subject; the disagreeable features of it are apparent to all who have ever worked on a farm. The principal features of this machine are its adaptability to land of all kinds, whether rolling or level, and the ease and quickness with which it may be applied to any pair of wheels about a farm. The platform, A, to which the thills are attached, is fastened to the axle by clamps; the driver's seat is also upon this platform, supported on easy springs. From the side of the thills, B, proceed the parallel bars, B', to which is secured the rake-head or shaft, C. This shaft works easily in the bearings, D. The rake-teeth are secured to small rods working in the tubes, E, and shaft, C, is provided with an arm, F, which connects by a link with the vertical lever, G, on the platform. This lever and the arm on the shaft below the platform adjusts the hight to which the teeth work, and is retained by the notched plate at the side; it allows the teeth to be lifted entirely clear of the load when it is desired to form a windrow. The rake-head can be further raised or lowered and permanently secured by means of the links, H, one on each side; these pass through clamps on the side of the thills, and have pins which retain them in place. The driver's feet are seen pressing upon a treadle frame, I; this frame connects with a parallel rod, J, extending over the teeth of the machine between the thills, so that by bearing upon the shaft the teeth are retained in contact with the load as long as desired. When the treadle is not in use it can be hooked up out of the way on the projection, K, under the driver's seat. The teeth readily accommodate themselves to the surface of the ground, and the facilities afforded for raising or lowering the rake-head render the employment of any pair of wheels of ordinary size feasible. These features are very excellent, and we think this machine is destined to become highly popular; we hear it very highly spoken of in our exchanges.



HUSSEY'S PATENT HORSE HAY-RAKE.

The patent for this invention was procured through the Scientific American Patent Agency, on June 23, 1863, by D. G. Hussey, and further information can be had by addressing him at Nantucket, Mass.

### PHENOMENA OF HEAT AND WATER.

Every person has witnessed the phenomena of water assuming the form of small globules when placed upon a heated plate of iron, such as the top of a stove. It has also been noticed that these globules do not vaporize so rapidly as water placed upon surfaces of a lower temperature; and besides this they usually roll about in violent agitation. Such phenomena connected with fluids and heat have been subjects of interest to men of science and caused much discussion. The accompanying figure represents a very convenient little device devised by Mr. John Johnson, for exhibiting the phenomena of the spheroidal condition of water; and it also shows that heat passes in *straight* lines through the metal. The device consists of a socket and tip capable of being secured on the top of a common gas-burner. The tip has a small dish-shaped copper disc soldered on its apex, and a series of gas openings are made underneath the disc. When the gas is ignited it plays in jets, as shown, upon the under surface of the disc, and when the metal is heated to about 300° Fah., a large drop of water is placed upon it, which soon assumes the spheroidal form and begins to rotate. And as the disc is more highly heated immediately above the gas jets, the heat passes directly through the metal to the water in straight lines, and the spheroid assumes the frilled form as shown by the spheroid in the figure. The number of these frills are generally multiples of the gas jets, and the spheroid resembles a transparent cut diamond rotating on the disc. Another phenomena connected with heat and the ebullition of water can be exhibited by this device. When the spheroid is rotating rapidly and vaporizing very slowly, if the gas is shut off and the disc allowed to cool several degrees below 280°,

Fah., the water will explode. This phenomena may have a bearing upon Professor Donney's experiments, which have been described in a previous number of the Scientific American, and it may account for several boiler explosions, from their plates becoming overheated for want of water, then cooled down by pumping in a cold supply.

There is much connected with the phenomena of water and heat that is still a mystery. For example, different fluids, such as alcohol and water, assume very different appearances as spheroids, and when the hand is moistened with water it may be plunged uninjured into molten iron or lead for a brief period. It is assumed that the moisture on the hand becomes spheroidal and repels the action of heat upon the skin. These phenomena deserve further investigation. For more information respecting the price and place where this little instrument may be obtained, we refer our readers to the advertisement of James D. Hall on another page.

### Gas from Anthracite Coal.

In our last number we noticed that a resolution had been offered at a meeting of the Common Council in this city, to permit the Anthracite Gas-lighting and Heating Company to lay down pipes, &c., to supply the city with gas; and we stated that illuminating gas could not be made from anthracite coal. Mr. Gwynne, the patentee of the new process, informs us that he uses anthracite as the carbonizing agent, and water as the agent from which he obtains the hydrogen to manufacture his gas. He states that a beautiful and much cheaper light can be manufactured by his process, from such materials, than that produced in the common way from bituminous coal.

### Plan for a New Gunboat.

Mr. C. Leavitt, of Windsorville, Conn., has forwarded to us plans of a new iron-clad gunboat, for which he claims a power of resisting attack hitherto unattained. The invention consists in having the armor suspended from the overhanging guards of a vessel by strong joints or hinges, and further arranged so that the plates can be tricd up under the guards when not in action. This system of defending vessels has never yet been tried, and should be experimented with, upon a limited scale, before steps are taken to build a vessel.

### BACK SPRINGS FOR BOOTS AND SHOES.

The peculiarity of this article is a flat steel spring, *a*, inserted in the back seam of boots or shoes, and running parallel with it. The spring is covered with leather, neatly stitched in on each side, as shown in Fig. 1. In each end of the spring are two slits,

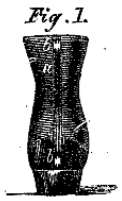


Fig. 1.

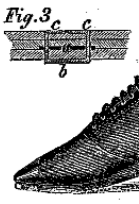


Fig. 3.

Fig. 2.

through which is passed a metallic clasp, *b b*, the ends of which are turned into the lining on the inside of the shoe, as shown by *c c*, in the horizontal section, Fig. 3, thus holding the spring firmly in its position. The advantage of this improvement is obvious at first sight. In putting the shoe or gaiter on the foot, the spring acts as a horn, not only preventing the counter or stiffening from breaking, but also all settling and wrinkling about the ankle when once on. It thus secures both neatness and comfort to the wearer, and is of especial advantage when the ankles are weak. The springs can be placed in after the shoe is made, and can be furnished to manufacturers, with the right to use them, at a trifling expense. The patent for this invention is ordered to issue, and the claim will be published in our next number. For further particulars address George W. Ludlow, Elizabeth, N. J.

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VOL. IX, NO. 2...[NEW SERIES.].....*Nineteenth Year.*

NEW YORK, SATURDAY, JULY 11, 1863.


## HOT AND COLD BLAST IN IRON-SMELTING.

On page 57, Vol. VIII. (new series) of the SCIENTIFIC AMERICAN we presented a considerable amount of useful information relating to the influence of the blast in the smelting of iron ores. The London *Mechanic's Magazine*, of the 5th ult., contains a very interesting article on the same subject. We stated that there were still several unresolved questions connected with the manufacture of iron, which invited further experiments to obtain new improvements; thus, it is well known that iron produced by the cold blast is generally superior to that obtained by the hot blast, while theoretically this should not be the case. Our London cotemporary alludes to this fact and says:—"The value of raising the temperature of the blast is another point upon which much difference of opinion exists. Some say that hot-blast metal is greatly inferior to cold-blast, in contradiction to others who assert the contrary opinion. The exact amount of economy of fuel effected by the use of this process is another subject of dispute. No definite data exist that would warrant our drawing conclusions as to its precise influence on the molecular structure and chemical constituents of iron. We consider that this great uncertainty is a disgrace to the iron manufacturers as a body. We consider it very extraordinary that the exact value of a process employed for the last thirty-five years is still involved in obscurity. The fact seems to be that the manufacturers on one side ignore the deductions of theoretical science, while, on the other, the laboratory chemists refuse to consider the practical requirements of manufacturing on a large scale."

So far as it relates to the quality of iron produced by the use of the hot and cold blast in smelting the ore, those remarks are undoubtedly applicable, but there can be no question of the fact, that a larger amount of iron—about one-third—is produced by the hot blast with the same quantity of fuel. Yet it is very generally believed that this economy of fuel is obtained at the expense of the quality of the iron. A larger yield of crude metal is obtained from the ore with the same quantity of fuel, but the increased yield is due to impurities fused under the higher heat of the hot blast, and these impurities simply go to add to the quantity. As the hot blast is in very general use in this country, if it is a fact that it produces an inferior quality of iron, it should be abandoned, for quality is of far more importance than quantity to those who use the metal. But as it is believed that as good metal can be made by the hot as by the cold blast—and theory supports such a conclusion—attention should be devoted to investigating the causes which lead to the production of inferior iron with the use of the hot blast, so as to obtain a remedy for the evil. In these days, when so much plate, beam and bar wrought iron is employed for ship-building and other purposes, the quality of the metal should be the first subject of consideration.

## READ YOUR PAPER!

Singular as the statement may appear it is not more strange than true that many persons subscribe for a paper and either hastily glance over it or else lay it aside unread, where it soon falls a prey to the builder of fires or the "snapper-up of unconsidered trifles." We doubt very much the wisdom of such a course; a newspaper is printed and sold to be read, and it must be a poor sheet indeed which does not contain some subject of interest or of information to its subscribers. The individual who should bring provisions to his house and allow them to spoil for want of use would seem lacking in common sense. What then shall we think of those who, while they feed the body, suffer the mind to perish and permit the whole intellectual machinery to get rusty for want of use? These remarks are stimulated by some experiences we have had with the SCIENTIFIC AMERICAN. In our column of "Useful Receipts," which by the way, have proved of incalculable value to countless persons, we give information weekly concerning various matters pertaining to the arts. These receipts, carefully read, will prove reliable on trial, but it will seem strange when we say that we have received letters at times from different persons inquiring for the very information which was lucidly written and plainly printed in their own copy of the SCIENTIFIC AMERICAN. We would say to all, read your paper carefully and you will derive much more benefit from it than by a cursory glance at its contents.

## THE AGE OF EXTORTION.

When this globe was first peopled, when all things bore the stamp and impress of innocence, and man neither molested nor was molested by his neighbor; when lawyers were unknown, and the forests stood up in their primeval grandeur and mourned not the loss of a single trunk; when the waters of the ocean were unvexed by a single keel, then, according to the ancients, existed the Golden Age. After this came the Silver Age, inferior, of course, to the preceding one, but still better than the Age of Brass. The world moves, and in due course of time the Age of Brass has returned again accompanied by another called the Age of Extortion. Stimulated by a universal consent, so it would appear, all classes of tradesmen hasten to advance the price of their wares, not in a *pro-rata* degree according with the decline of value in our currency, but reckless alike of commercial usage, of established custom and principle, two, three, and four prices are unblushingly demanded for goods that formerly sold for a tithe of the sum asked. Take the item of ice, for example; the public were gravely informed at the beginning of the season that, owing to various causes, among which was classed the scarcity of the article from the mildness of the winter, ice could not be afforded at previous rates, so that to indemnify themselves against loss, the suffering ice companies must double the rates and charge fifty cents where they were formerly glad to obtain twenty-five. Will any one say that this is a fair business transaction? Ice was not so scarce as the "combination" would have us believe. The cry was put forth early in the spring that such would be the case, probably to prepare the public for the "little advance," but a response came from that great depot of ice—Boston—that the deficiency was exaggerated, and that no inconvenience would result. We believe to-day that the stock of ice is amply sufficient to materially moderate the prices charged for the necessity, and while we do not for an instant object to a fair advance on previous rates to cover the tax, &c., we condemn utterly the "combination" to keep up prices which we believe exists and is apparently sustained by the ice companies of this city. Coal is another instance of the avarice and greed for gain that has infected all classes. At this season of the year it generally declines in value fully one dollar per tun. As it would tend very materially to lessen public confidence in the ability of the coal-mining interest to exceed all others in extortionate prices, if an advance was not made, they have accordingly added one dollar per tun to their selling price; and even this rate we are told will soon be enhanced. Of course, the usual excuses are proffered, concerning the strikes of the miners and the scarcity of labor, but such assertions are soon silenced by the naked fact that there has been nearly one million tuns more coal mined this year than that during a similar period in the past twelve months. The retail dealers cannot make much, and the gross receipts must swell the profits of those who rule the market.

From the dealer whose sales amount to but a few dollars a day, up to him who reckons his receipts by thousands, there would seem to be a remarkable unanimity in asking fabulous prices for goods. If here and there we did not find an honest tradesman who sold his goods at a fair advance to cover the increased cost of living, we should lose faith in mankind, and begin to think, with the deserting soldier, that the war had fearfully demoralized all classes. The Ages of Gold and Silver have indeed passed away, for scarcely a vestige of them are to be seen either in trade or elsewhere; certainly one cannot trace the influence of them on mankind. The Age of Brass reigns, and yet another must be added to these two—the Age of Extortion.

## THE LONDON PATENT OFFICE AND MUSEUM.

Although the system of granting patents exclusively to inventors and introducers of new and useful improvements originated in England, from whence we derived the basis of our system, still America has taken the lead in the perfection of that system. The credit of establishing a special department for the examination of applications and the granting of patents, embracing a museum of models for reference, belongs to the United States, and England has lately copied much that is good from us. The organization and management of our Patent Office is so well known to our readers that we do not require to occupy any space in alluding to it here; but the recent changes in the English Patent Office system, and some important features connected with it, are not very generally known. A description of these, we believe, will be of general interest.

A patent for an invention is a privilege granted by a Government to an inventor; it embraces his exclusive property in it, and forbids all other persons making, using, or selling it without his consent for a certain number of years. It is a national recognition of the fact that an inventor has the exclusive right to the produce of his mind embodied in a tangible form. In America the mode of obtaining patents, compared with that which long existed in England, is cheap and simple. In 1851, during the period preparatory to the first International Exhibition of Industry, movements were made to reform the British system, and in the subsequent year a radical change was effected. The whole of the operations were placed under the control of a Board of Commissioners of Patents, consisting, *ex-officio*, of the Lord Chancellor, the Master of the Rolls, the Attorney-general, the Solicitor-general, the Lord Advocate and the Solicitor-general for Scotland, and the Lord Advocate and Solicitor-general for Ireland. Formerly separate patents had to be taken out for the three kingdoms, but one patent embraces them all now.

The most wonderful result of the reform in the British patent system is the publication of old and new patents. All the old patents written on parchment, which had existed in the Office of Records for over two hundred years prior to 1852, have been exhumed and printed, with lithographic illustrations, forming the most complete published record of inventions extant. They are contained in large splendidly-bound volumes, copies of which have been sent free to all the important free libraries in the world. Every patent issued in England for the last eleven years has also been printed with illustrations, and the number of such has been about two thousand per annum. The whole of the specifications published number about 35,000 (about four thousand less than the number issued in the United States), and these are contained in 1,600 volumes. The specification of any of the new patents can be purchased for the cost of printing and paper, the price ranging from fourpence to as many shillings, according to size. They are printed in quarto, with lithographic illustrations. The Superintendent of Specifications is Mr. Bennett Woodcroft, under whose able management all the different subjects have been classified and several complete indexes made of the whole collection. One index is chronological, giving the order of patents issued according to dates; another is alphabetical, giving the names of patentees; and another index relates to the subject-matter. The different subjects are grouped under 150 headings, with four sub-headings, making 600 in all. The patents issued for improvements on steam engines, pumps, presses, printing, spinning, weaving, &c., can easily be found under their respective headings. And be-

sides the large volumes containing the printed specifications in full, there is a reference-index containing notices of books and papers which have reported legal proceedings concerning patent trials. Besides these there is also published a series of useful abstracts of the patents granted, each giving a very intelligent idea of the invention contained in the specification to which it refers. Each series of these abstracts forms a convenient octavo volume. Down to the last year, the number of abstracts of patents published occupied twenty-three volumes, but the whole will not be completed for four or five years to come, when the number of abridgements will amount to about 50,000. The publication department of the British Patent Office, it will thus be observed, is one of the most remarkable institutions in London, and the expense of maintaining it does not come from the national exchequer, but rom the surplus funds derived from patent fees.

Copying the example of our American Patent Office, a museum has also been created under the management of the new Board of Commissioners. It was first fairly commenced in 1858, in a room hired from the Department of Science, and it soon became an interesting place, as it has been visited by no less than 700,000 persons in five years. It is open all day and part of the evening all the week, Sundays excepted. It contains Sir Samuel Moreland's calculating machine, invented in 1666; also James Watt's model of his steam engine, patented 1769, and a large number of the models of very old as well as new inventions. This room has also been decorated with the portraits of many great inventors and mechanics, such as those of Brindsley, Smeaton, Arkwright, Newcommen, Crompton, Watt, Trevethick, the Brunels, Rennie, the Stephensons, and other great men whose inventions and engineering achievements have enriched their country. This is one of the most pleasing features connected with the English Patent Office museum. Inventors may be ranked among the noblest benefactors of a nation, and their memory cannot be too highly revered. This museum has become too small, and it is now proposed to erect a new and spacious building devoted to the same purposes as our Patent Office in Washington, but embracing a very important improvement as one of its objects. It is intended to make the new museum an educational establishment for mechanics, artisans, &c., by having constructed for it working models of machines, showing the progressive steps of improvement in machinery applied to various branches of manufactures; and from these practical mechanics may derive most profitable instruction. The surplus fund of the English Patent Office amounts now to more than six hundred thousand dollars—a sum sufficiently ample, if economically applied, to erect a splendid structure. This fund, however, is under the charge of the Treasury Department, and is controlled by a body which has not yet taken such a deep interest in the affairs of inventors as they deserve, or an appropriation would have been ordered prior to this time to carry out the project. The Commissioners of Patents, however, are earnestly urging the subject upon their attention, and it is to be hoped they will soon have their laudable desires gratified.

## DINING-HOUSES FOR THE MILLION.

In the city of Glasgow an example worthy of very general imitation has been set, in providing new eating-houses where cheap meals of excellent food can be obtained by mechanics and laborers and others. These have been called "Kitchens for the Million." They are simply public dining-rooms like our restaurants, where a wholesome and substantial meal can be obtained for fourpence sterling —about eight cents. These are not charity institutions nor common soup-kitchens, but healthy commercial enterprises—a great improvement upon old-fashioned dining-houses in supplying mechanics with palatable and cheap meals, and yielding the proprietors a handsome profit. The fame of these cheap eating establishments having reached London, a correspondent of the London *Times* paid them a visit, and writes in high terms of their management. He says:—"For fourpence-halfpenny I got a pint of pea soup, a plate of hot minced collops (minced beefsteak stewed), a plate of potatoes, and half a pound of bread. Mr. Stirling, a wealthy gentleman of Keir, got for the same sum a pint of broth, a plate of cold beef, a plate of potatoes, and a slice of plum pudding. After we had thus dined we called—in passing through the lower room—for a cup of coffee and a slice of bread-and-butter, and were supplied, on paying twopence, with a large cup of coffee and milk, and four ounces of bread, butter, &c. The remarkable feature of this entertainment was that every article was of the best quality. Better broth, soup, potatoes, and meat are not to be had in any club in London than in these Glasgow dining-rooms. At no railway station that I have ever stopped at in Great Britain are such coffee, milk, bread, and butter ever sold at all."

These cheap dining-rooms, of which there are several in Glasgow, have been undertaken by a company, and the cooking is all performed in a special central department unconnected with the dining-rooms, where the food is kept warm for the customers. The dining-rooms are spacious, very clean and neat, and each presided over by a matron who superintends the serving out of the rations. The waiters are all girls, dressed in short white linen sacks, dark skirts, and their hair confined in nets. Everything around the tables—knives, forks, spoons, plates, and waiters—are kept scrupulously clean. No beer, wine, or spirits of any kind can be had, but good coffee, soup, tea, and refreshingly cool water. The prices of provisions, coffee, sugar, &c., in Glasgow are about the same as those in New York, but house-rent and city taxes are much lower.

## ROUGH FORGINGS.

We have often remarked, in the course of our professional experience, upon the indifference displayed in some of our large machine-shops toward obtaining good iron forgings. In certain intricate shapes, where the safety of the work would be imperilled by too much elaboration, when often heated, where some heavy parts are in close proximity to some very light portions, it is perhaps advisable to bring the work something near the finished size and leave the rest to be removed by machines intended for such business. Instead, however, of working as closely to the drawing as they might, a great many blacksmiths leave altogether too much iron for the turner and planer to cut off. This practice is to be reprehended, as in addition to the increased cost of the job, the value of it as material is very much reduced. If a blacksmith leaves from three-fourths to an inch and a quarter of sound iron for the turner to remove from a shaft 5 inches in diameter, he is guilty of a very great waste of time, labor and material. We do not allude to shafts turned up from rolled iron; any person who had to make a 5-inch shaft and should deliberately select a 6-inch bar of iron to turn it out of, would be regarded as demented by all sensible persons. If the practice is not to be tolerated in the case of rolled iron, how shall we reconcile the fact of forging a piece of shafting very much larger than there is any occasion for, with mechanical common sense?

Trip hammers are very useful tools in a blacksmith's shop, for they condense metal into itself and compact the fibers of it firmly together. What shall be said of those persons who leave such an excess of metal that the best of it is all turned off by the machinist at a dead loss to the proprietors? Comparatively a blacksmith can work faster than a machinist; he can heat his iron and dress off a piece of metal that would require four times the labor on the part of the mechanician. So also with heavy hammers, they can draw down an inch and a quarter of iron much sooner than a lathe can turn it off, and the shaft so hammered will be a far better one than another roughly forged.

In locomotive-shops there are better forgings made than there are in the marine engine-shops in this city. There is more die-work and a greater attention given to producing smooth, sound, even and good forgings than in the large works above mentioned. It seems to us that this subject ought to receive some attention. It is as easy to make a forging somewhere within rifle cannon range of the finished dimensions as it is to produce a lump of iron with scarcely the most remote resemblance to the final outline. The scale ought to be removed much oftener than it is. When iron is over-heated the impurities in it work out to the surface; a certain portion of the exterior, a very thin skin of it, is burnt, this makes a hard, vitreous scale that ruins the edge of a tool in a short time. Every blacksmith knows very well how to knock it off and improve not only the looks of their own work but lessen materially the time demanded by subsequent operations. These matters are worthy of attention. They are those little details of machine work that are too often lost sight of, but which exercise a very material influence over the profit and loss account. A minute in a factory represents some portion of a dollar, whatever the same may be; it does not require any very brilliant effort of logic to see that many minutes make many fractions of a dollar. The waste of time in doing useless work has a pecuniary value, and it is just as foolish to cut an inch or half an inch off of a shaft, when it could be avoided, as it would be folly to throw money into the sea. Let us have no more such waste, but turn out blacksmith work in some degree approximating to the mechanical advancement of the age. We have seen shafts forged (aye, and turned them too) that required to have two inches cut off the ends before they were of the right length. Such carelessness, for it is nothing else, shows a want of consideration for the employer's interest that should be seen to at once by those concerned.

## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

*Fuse for Projectiles.*—This invention consists principally in the construction of a percussion fuse-tube or plug with two separate chambers, one to contain fulminate of silver or mercury or other fulminating powder, and another to contain sand, emery, broken glass, or any other hard granular substance, the said chambers being arranged and combined by means of a lock of simple construction as to be perfectly closed and locked to prevent communication between them until the firing of the charge of the piece of ordnance from which the projectile is to be thrown, and then to be unlocked by the impact produced by the explosion of the said charge, and thereby permit communication between them for the admixture of their contents; so that on the projectile striking, the concussion and friction produced between the fulminate and the said hard substance may ignite the former and so fire the bursting charge of the projectile. It also consists in the construction and arrangement of the parts of such a lock in such a manner that, though it be unlocked at or near the bottom of the bore of the gun, it will be prevented from opening the communication between the two chambers until after the projectile has left the bore of the gun. It further consists in the employment, in combination with fulminates in percussion fuses, of cotton, gun-cotton, wool, hair, cloth or other soft material, either mixed with the fulminate or as a lining to the chamber which contains it or in the form of a cushion, for the purpose of preventing premature explosions by accidental concussions. And it further consists in the employment, in the percussion fuse of an explosive projectile, of two fulminates, one of which is more sensitive or more easily ignited, as fulminate of silver, and the other of which burns more slowly or with a slower flame, as fulminate of mercury, the latter being mixed with the former or interposed between it and the bursting charge of the projectile to insure the ignition of the said charge. I. P. Tice, of New York city, is the inventor of this improvement.

*Evaporator for Saccharine Liquids.*—This invention consists in the arrangement of an endless oblong, circular or elliptical track, in combination with wheeled pans and suitable fireplaces and flues, in such a manner that, when the juice or other liquid in one pan has been boiled down to the desired degree, said pan can conveniently be removed to the opposite side of the track for the purpose of emptying and recharging it and, at the same time, another pan can be wheeled over the arch so that the operation of boiling is not interrupted and no heat is lost; it consists, further, in the arrangement of a stationary pan between the fireplaces and the movable pans and

the chimney, and over a double flue provided with dampers in such a manner that the waste heat escaping from the flues under the movable pans can be carried under the stationary pan and used to heat the contents of the same or carried straight through to the chimney without being permitted to come in contact with said stationary pan, if it is desired to empty the contents of the same or to exchange it. James Bucknell, of Decorah, Iowa, is the inventor of this improvement.

*Apparatus for draining Sugar.*—The principal object of this invention is to save the very heavy labor of carrying the sugar in ladles from the cooler to the molds in which the draining and crystallization is effected, and pouring it into the molds by hand as hitherto universally practiced in sugar refineries, and to enable the molds to be filled directly from the cooler; and to this end it consists in the employment, for the reception of the molds, of wheel carriages so constructed as to hold several molds in upright positions and to be capable of being run under the cooler for the purpose of filling the molds directly therefrom, and of being run away to a convenient place for the draining to be performed. It also consists in furnishing such a carriage with a number of movable stoppers corresponding with the number of molds it is to contain, and so arranged and applied as to be capable of being operated by one or more levers or their equivalent, outside of the carriage, for the purpose of closing up the bottoms of the molds at the time of filling and of opening them for draining. It further consists in providing, in such a carriage, below the seats which receive the bottoms of the molds, a vacuum chamber in which a vacuum is to be obtained by any suitable means for the purpose of exhibiting the process of draining by the aid of the pressure of the atmosphere on the upper surface of the sugar in the mold. Gustavus Fincken, of New York city, is the inventor of this improvement.

*Sheet metal Vessels.*—This invention relates to cans, pails and other vessels made of sheet-metal with soldered joints. Its object is two-fold, namely, first, to obtain such strength and stiffness at the junction of the sides with the top and bottom that they will not be easily bruised; secondly, to provide for the soldering on of the top and bottom by dipping the joint into a vessel containing melted solder, whereby the operation of soldering is not only enabled to be performed more quickly than in the usual way by a soldering iron, but with a much smaller quantity of solder; and it consists in forming the junction between the sides and the top and bottom of the vessel by means of a peculiar lap-joint by which the above desirable results are obtained. Hermann Miller, of New York city, is the inventor of this improvement.

*Mode of applying Safe Locks.*—Safe locks of the expensive burglar-proof kind are quite complicated, as is well known, and liable to get out of repair, so as not to be capable of being opened in a legitimate manner by the proper key, and this contingency almost invariably happens if the lock has been tampered with by a burglar. When this occurs the door has to be cut open at considerable expense and trouble in order to reach the lock so that it may be detached for repairs. The object of this invention is to obviate this difficulty, and to this end two locks are applied to the door, arranged or connected in such a manner with the bolt frame that in case of one lock getting out of repair, so that it cannot be opened by its key, the door may be unlocked by the other lock. J. J. Burnet and William Bellamy, of New York, are the inventors of this improvement.

*Setting Boilers.*—This invention relates to an improvement in the bridge walls under a boiler and in the disposition of the flues which pass through the boiler. By the ordinary mode the bridge walls are built up to within six or eight inches of the boiler, for the purpose of forcing the draught up to it. Instead of that plan, one or more arches are built up in direct contact with the boiler, leaving the opening of each arch some two feet below the surface. The effect produced by this arrangement is to cut off the open and direct current of air under the boiler and create several chambers or pits in which the heated air is detained and is consequently applied more effectually in the generation of steam. This improvement also relates to the mode of passing the draught through the flues. With a boiler with two flues it has heretofore been usual to pass the draught under the boiler to the back end, and forward through the two flues to the chimney or stack in front. By our arrangement the heated air passes under the boiler to the rear and forward through one flue, and then back again through the other to the stack in the rear, thus using the heated current three times instead of twice, as heretofore. Henry France and Chas. L Knowles, of Sacramento, Cal., are the inventors of this improvement.

*Tubular Boiler.*—In the present mode of generating steam in locomotive tubular boilers, the heat rises from the grate bars and passes directly through the tubes into and out of the smoke-stack. In this steam boiler the heat, after passing through the tubes to the rear end of the boiler, is caused to deflect by means of a plate secured on a level with the water line, or just above the tubes in the false breeching, into pits and under the boiler to the extreme front, passing up the sides into the flues on both sides of the boiler, arranged on a level with the water-line, and thence into the smoke-stack, in such a manner that a large amount of heating surface is gained and a proportionate saving in fuel is effected. Henry France and C. L Knowles, of Sacramento, Cal., are the inventors of this improvement.

*Manufacture of Hats.*—This invention relates to the manufacture of hats with bodies of palm-leaf or other material of similar character, covered with felt, cloth, plush, or other woven fabrics. Its principal object is to produce a more perfect union of the covering with the body; and to this end it consists in coating the body with a solution of india-rubber preparatory to the application of the coating of varnish commonly known as "hatter's varnish," by which the covering is made to adhere. This coating of india-rubber solution makes a more perfect adhesion of the varnish to the body and prevents it from cracking off by the application to the hat of any pressure which indents and temporarily alters its shape. It also consists in pasting a binding of muslin or other suitable woven fabric around and over the edge of the brim, for the purpose of confining the ends of the strips of palm leaf, or similar material, of which the body is composed, and thereby insuring a smooth edge and giving greater firmness to the brim. F. P. Flanagan, of Newark, N. J., is the inventor of this improvement, and his claim may be found on page 11 of the current volume.

*Machine for nailing Boxes.*—The object of this invention is to drive the nails which hold together the several boards constituting a box for segars or for other articles. The nails are generally driven by a hammer, each nail by itself, which obviously is a very tedious operation. This invention consists in the employment of grooved spring jaws for the purpose of holding the nails and to guide them to the proper place, and it consists, further in combining with said spring jaws a corresponding number of rising and falling plungers, for the purpose of driving each nail singly and all at the same time; also in arranging said plungers with globe or disk-shaped collars, in such a manner that they spread the grooved spring jaws at the proper moment and allow the heads of the nails to pass; also in arranging the cam that serves to depress the plungers with a circular portion in such a manner that the plungers cannot be depressed any further than necessary to drive the nails. Finally, in the general arrangement and combination of all the parts so that the plungers and jaws, as well as the table which supports the boards, can be adjusted according to the different sizes of boxes to be made. George Wicke, of No. 26 Willet street, New York city, is the inventor of this machine, and his claim may be found on page 12 of the current volume.

### Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, i. e., heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 23, 1863.

*Reported Officially for the Scientific American.*

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

38,935.—Self-loading Fire-arm.—Albert Ball, Worcester, Mass.:

I claim, first, The combination of D, and the charging carriage, as above set forth and described.

Second, I claim the combination of the locking piece, P, charging carriage, O, and tumbler, I, when constructed and operating in the manner and for the purposes above set forth and described.

38,936.—Lever Jack.—Nathan Badgley, New York City:

I claim the shape and construction of the reciprocating lever, L, operating as herein described.

I also claim the curved slot with its bearings on each side of the frame, D.

I also claim the arrangement and combination of the devices of the plate, H, lever, L, with B, arranged and combined as herein described.

38,937.—Grain Separator.—Myron J. Barcalo, Mount Morris, N. Y.:

I claim the application of the plate, f, to the upper end of the screen, B, covering not only the joint of the screen and the chute but the rough edge of the wire gage and several rows of the meshes nearest to the upper end of the frame of the screen, substantially as herein set forth.

I also claim the separator plate, D, in combination with the plate, f, and operating substantially as herein described and set forth.

38,938.—Skating Boot.—Gardner T. Barker, Pittsfield, Mass.:

I claim the improved construction of the runner, e, and its application to a boot or shoe substantially as described.

38,939.—Railroad Car Coupling.—Homer J. Blakeslee, Concord, Pa.:

I claim the sliding bolt, E B, the collar, H, the falling bolt, F, the link, N, when the same are constructed as described, and in the aforesaid combination for the purposes set forth.

38,940.—Preparations to serve as Hemostatic and Antiseptic Agents.—Pierre A. F. Boboeuf, Paris, France:

I claim the manufacture and application as hemostatic and antiseptic agents of alkaline "phenates" and salts obtained by means of mineral and vegetable essential oils soluble in caustic soda or potash, in manner and for the purposes hereinbefore described.

38,941.—Vault Cover.—E. S. Boynton, Alexandria, Pa. Ante-dated Jan. 3, 1862:

I claim lighting and ventilating subterranean or lower apartments, by means of a metallic frame in combination with sash, with glass fitted and sliding therein, the glass being protected by an open iron grating, or perforated cover, constructed substantially as described.

38,942.—Stove.—N. A. Boynton, New York City:

I claim making the magazine cylinder, fire-chamber, fire-flues, gas chamber, and window projections, all in one piece, as herein shown and described.

[This invention consists in a novel application of mica to the fire-chamber of the stove or furnace, whereby the light from the burning fuel may be exposed and the mica at the same time fully protected from the fuel, the latter being effectually prevented from coming in contact with the former.]

38,943.—Breech-loading Fire-arm.—Christopher C. Bfand, Norwich, Conn.:

I claim, first, The combination of a sliding breech-block with a hammer and pendent hook to seize and hold the cartridge by its flanged butt, the arrangement being such that the hook is actuated by the hammer to operate in connection therewith substantially as herein set forth.

Second, I claim the combination of a breech-pin sliding to and from the barrel—but out of line of its axis—with a hook and hammer to seize and hold the cartridge by its flanged butt, the arrangement being such as to allow the cartridge to move on the hook as fulcrum, as the breech-pin recedes from or approaches to the butt of the barrel, substantially as herein set forth.

Third, In combination with a sliding breech-pin provided with hooks or their equivalent to receive and hold the cartridge and moving together with the lock in a recess in the stock, I claim a trigger directly connected with the stock and operating the lock only when the breech is closed substantially as herein set forth.

38,944.—Railroad Chair.—Sylvester Brisack, Walton, N. Y. Ante-dated Oct. 21, 1862:

I claim the construction of a railroad chair in such a manner that it may be used for coupling the rails of fastening them on the ties, and may be placed on the rails without displacing them; and also the entire mode of connection as shown in the drawing and description, and also the entire form of the wedge as so shown, which together are so constructed as to securely fasten the rails in the chair and also act as a bracket to support the head of the rail and prevent its springing or turning and so constructed also that the pressure of the wedge acts as a cramp or spring on the rail so as to hold the rail and wedge firmly when contracted by cold and allow the parts to give when expanded by heat so as to avoid breaking and also so as to receive all pressure on the rail to act directly on the center of the web and foot of the rail and on the center of the chair.

38,945.—Apparatus for evaporating Saccharine Liquids.—James Bucknell, Decorah, Iowa:

I claim, first, The arrangement of two endless tracks, B C, in combination with wheeled pans, A, and fire-place, E, constructed and operating in the manner and for the purpose substantially as shown and described.

Second, The arrangement of the double flues, c d, and stationary pan, G, in combination with the fire-place, E, flues, D, and movable pans, A, constructed and operating substantially as and for the purpose specified.

38,946.—Ventilator.—Frederick D. Chase, Boston, Mass.:

I claim in the above-described deck-guard and ventilator, the combination of the annular rain cap, F, and air opening, b, with the smoke pipe, E, the ventilating passage, a, and its air-receiver, G, provided with inlets and a register as specified.

And I also claim the combination of the cap plate, A, with the air-receiver, G, its smoke-pipe, E, and fastening plate, B, by means of the adjustable pipe, C, applied to and so as to be capable of sliding into the frustum, D, and made to circumscribe the smoke-pipe, substantially as and for the purposes hereinbefore specified.

38,947.—Glass Chimney for Lamps.—G. F. J. Colburn, Newark, N. J. Ante-dated Oct. 5, 1862:

I claim a glass lamp chimney, A, with one or more glass handles or projections, B, substantially as described.

[This invention consists in providing an ordinary glass lamp chim-

ney with a glass handle or projection, one or more, in such a manner that the chimney may be handled and removed from the lamp while in a heated state without burning the fingers.]

38,948.—Cleaning, hulling and grinding Grain.—Emanuel Cole, Dryden, N. Y.:

I claim, first, The means substantially as herein described by which the stone, D, is secured in the removeable frame, B, for the purpose set forth.

Second, The means substantially as herein described, by which the top stone, D, and its connections are supported in a fixed plane and removed, and replaced for the purposes, and with the advantages specified.

Third, The construction and arrangement of the curb, M, substantially as and for the purpose herein described.

38,949.—Manure Distributor.—Jacob B. Crowell, Greencastle, Pa.:

I claim the rocking shaft provided with the stirrers, H and G, and the wipers, D, in the manner and for the purposes set forth.

Second, In combination with the rocking shaft as described, I claim the clutch, P, crank, O, and pitman, N, all constructed and operating in the manner and for the purposes specified.

38,950.—Hay and Cotton Press.—George N. Doolittle, Louisville, Ky.:

I claim the shaft, D, passing through the press-box, A, and provided at its upper end with a sweep, E, and at its lower end with a crank, F, in combination with a pitman, G, plunger, B, and plunger-rod, C, and rope, J, all arranged in relation with the press-box, A, to operate as and for the purpose specified.

[This invention consists in the employment of a windlass in connection with a crank and pitman, all being arranged with a plunger and plunger-rod in such a manner that the press-box may be filled with the substance to be baled and properly compacted therein previous to the pressing operation.]

38,951.—Churn.—Harrison Doolittle, Alton, Ill. Antedated Nov. 3, 1862:

I claim the lining figure 2, made of tin or zinc, when made with the slats, E, and the holes, F, and the holes, T, in the manner described, and for the purpose specified.

38,952.—Double-tree.—W. Dowell, Hicksville, Ohio:

I claim the tubes, B B, attached to the ends of the double-tree, A, as shown, provided with the springs, D, and rods, E, and connected by the rod, C, all arranged substantially as and for the purpose specified.

[This invention consists in having a tube attached to each end of the double-tree by pivots and having said tubes connected by a rod. the tubes being provided with springs and rods, and all so arranged that an elastic connection is obtained between the draught animals and the vehicle, and the team much relieved and the vehicle saved from wear and tear.]

38,953.—Boxed Sieve.—James O. Durgin & Jeremiah Walker, Yarmouth, Maine. Ante-dated Jan. 11, 1862:

We claim in combination with the sieve its case, and the machinery for imparting to the sieve vertical and reciprocating rotary movements as described, the supporting bar, D, and the guide cross, E, the whole being applied together and to the case substantially in manner and so as to operate as hereinbefore specified.

38,954.—Sleigh.—Daniel P. Fales, Poultney, Vt.:

I claim the combination of the continuous brace, c, with the runner, A, with the knee or post, B, and beam, D, as herein described and set forth.

38,955.—Type-setting Machine.—Charles W. Felt, Salem, Mass.:

I claim justifying lines of type, by means of mechanism which operates wholly or partially in the manner substantially as described.

38,956.—Setting Steam Boilers.—Henry France & Charles L. Knowles, Sacramento, Cal.:

We claim, first, The arrangement of two or more pits, H H′, formed below a boiler, A, by means of one or more bridge walls, F, with an arched opening, G, at a certain distance below the surface as and for the purpose described.

Second, The horizontal plate, d, under the flue or flues, B, of a steam boiler, A, in combination with the side flue, I, constructed and operating substantially as and for the purpose specified.

Third, The arrangement and combination of the pits, H H′, side flue, I, flue or flues, B′, in the boiler, A′, rear connecting flue, L, and flue or flues, B, in the boiler, A, all constructed and operating substantially as and for the purpose set forth.

38,957.—Setting Tubular Steam Boilers.—Henry France & Charles L. Knowles, Sacramento, Cal.:

We claim, first, The pits, C C′, and arched bridge wall, B, in combination with a tubular or flue boiler and with the side flues, F, constructed and applied substantially as and for the purpose shown and escribed.

Second, The deflecting plate, a, over the ends of the tubes, T, in combination with the pits, C C′, bridge wall, B, vertical flues, E, and side flues, F, all constructed and operating substantially as and for the purpose shown and described.

Third, The application of the side-flues, F, in combination with a steam boiler, A, constructed and operating substantially as and for the purpose specified.

38,958.—Manufacture of Sugar from Sorghum.—Joel C. Garretson, Pilot Grove, Iowa:

I claim the arrangement and combination of the grading pans, B, with shutters, D, at the end of each partition, A, with skimmer, F, extending over all the apartments, B, arranged and combined for the purpose of grading and granulating sugar in the mode and manner escribed.

38,959.—Straw-cutter.—C. G. Grabo, Greenfield, Mich.:

I claim interposing an elastic material, x, between the stationary cutter bar, u, and the frame of the straw-cutter substantially in the manner herein described.

I also claim the combination of the rotary cutter wheel, G, with the stationary tapering cutter bar, u, and interposed elastic material, x, substantially in the manner and for the purpose herein described.

I also claim in combination with the rotary cutting wheel the adjustable journal box, K, for the purpose of adjusting the cutter wheel towards the stationary cutting edge, u, substantially in the manner herein described.

I also claim in combination with the yielding and tapering stationary bar, u, the adjustable cutting blades, d, substantially in the manner and for the purpose set forth.

38,960.—Lamp Burner.—James B. Gray, Hudson, Wis.:

I claim, first, The combination of the divided lamp cap with a vertically adjustable wick-tube, substantially as and for the purposes herein described.

Second, The hooked friction spring, d, or its equivalent in combination with the adjustable wick-tube and the divided lamp-cap, substantially as described.

38,961.—Shirt Collar.—Solomon S. Gray, Boston, Mass.:

I claim a shirt collar in which the part, B, is turned over on to the part, A, in the curved or angular line, x, instead of a straight line, in order to prevent the part, A, from wrinkling, substantially as described.

38,962.—Lubricator for Locomotive Engines.—E. C. Hamlin, Pavilion, N. Y. Ante-dated Dec. 27, 1862:

I claim the arrangement of the oil pipe, C (on locomotives), with the branches, E and F, the cocks, f g and h, and their connecting rods, a b, &c., in the manner and for the purposes specified.

Also combining the branch oil pipes, E and F, and the branch steam-pipe, G, the cocks, f g and h, and their connecting rods, a b and c, with the main oil pipe, C, and the steam pipe, B, in the manner and for the purpose specified.

38,963.—Press for Baling.—John K. Harris, Allenville, Ind.:

I claim the wheel, F, provided with the ledge, H, the rope or chain, E, and follower or plunger, C, all arranged and combined to operate as and for the purpose herein set forth.

[This invention relates to an improvement in that class of baling presses in which the press-box is filled by a beating operation of the plunger or follower, preparatory to the pressing operation of the latter; the invention consists in the means employed for operating the plunger or follower, so that it may be elevated to the desired height, and then released so as to fall and give the desired blow, and then be elevated all by a continuous movement of the driving shaft.]

38,964.—Washing Machine.—Jonathan F. Horn, Boston, Mass.:

I claim the improved machine, made substantially as described, that is to say, with a vibratory dasher, a bottom rack and two movable side racks, constructed, arranged and applied together in manner and so as to operate substantially as described.

And in combination therewith, I claim the loaded momentum lever, or lever and weight arranged and applied to the dasher so as to operate the same as described.

38,965.—Horse Rake.—David G. Hussey, Nantucket, Mass.:

I claim the attaching of the teeth, L, to the shaft or rake-head, J, by means of the rods, r, fitted loosely in tubes, q, which are secured to the shaft or rake-head, substantially as and for the purpose set forth.

[This invention consists in a novel construction of the rake and the manner of applying the same to the frame of the machine, whereby the device may be used with and readily applied to any pair of wheels used on other vehicles, and the teeth of the rake also allowed to rise and fall freely and independently of each other, so that they may conform to the inequalities of the ground over which they may pass; the rake-head being also so arranged that it will be under the complete control of the operator, and adapted to perform its work in a thorough or efficient manner.]

38,966.—Turn Bridge.—James Ingersoll, Grafton, Ohio:

I claim the bridge, D, in connection with the tower, C, and turntables, B and F, all arranged to operate substantially as set forth.

[This invention consists in having the bridge attached to a turntable which is placed on a suitable foundation, the turn-table encompassing the base of a tower on the top of which there is fitted another turn-table to which rods are attached, said rods being connected to and supporting the outer part of the bridge; all being arranged in such a manner as to form a simple, economical and durable turn-bridge.]

38,967.—Cooking Stove.—James A. Lawson, Troy, N. Y.:

I claim the employment of the ash-pan drawer, D, in combination with the hopper, C C′, in the manner substantially as herein described and set forth.

I also claim the adjustable end, E, arranged and combined with the ash-pan drawer, D, substantially as and for the purposes herein described and set forth.

38,968.—Sash Stop or Fastening.—S. P. Loomis & T. Hawk, Manchchunk, Pa.:

I claim the roller, D, placed in the case, C, which is provided with an inclined back, b, and fitted in one side of the window-frame; in combination with the lever, F, and the slide bolt, G, all arranged substantially as and for the purpose herein set forth.

[This invention consists in having a roller fitted in a beveled or inclined recess in one side of the window frame, and using in connection therewith a lever and slide bolt, all arranged in such a manner that the sash may be retained at any desired height and also securely locked when in a closed state.]

38,969.—Harvester.—Frederick H. Manny, Rockford, Ill.:

What I claim in that class of harvesting machines having the finger beams forward of the driving wheel, is the combination of the hinged platform with the divided frame when made adjustable substantially in the manner and for the purpose described.

38,970.—Harvester.—Frederick H. Manny, Rockford, Ill.:

I claim the shield-board, constituting both a separator and track-clearer, substantially as herein described, for the purposes set forth.

I also claim the combination of an adjustable shield-board, which acts both as a separator and track-clearer, with a supplementary divider, substantially in the manner and for the purpose described.

38,971.—Mill-stone Bush.—J. F. McKray, Harmonsburg, Pa.:

I claim, first, The application of the cap, D, with oblique notches, e, in combination with the tapering collar, d, of the spindle, and with the main cap, E, of the bush, constructed and operating in the manner and for the purpose substantially as specified.

Second, The position plate, g, in combination with the annular lip, h, projecting from the inner surface of the cap, E, as and for the purpose shown and described.

Third, The tapering oil-cups, m, in the interior of the bush, A, in combination with the packing and with the follower, B, constructed and operating substantially as and for the purpose set forth.

[The object of this invention is to obtain a durable bush for the spindle of the bed-stone; one that will admit of a certain degree of adjustability, so as to conform in itself to the position of the spindles; one that will also insure a perfect lubrication of the spindle, and also protect the spindle from foreign substances that might otherwise work between the collar and caps, and produce unnecessary friction and wear.]

38,972.—Tea Kettle.—Barney H. Menke, Cincinnati, Ohio:

I claim as an improved manufacture of bailed and covered hollow-ware, the provision of the thimble, F f f′, adapted to fit over the bail ear, and to confine the lid while permitting its free horizontal vibration, the whole being secured by the insertion of the bail, in the manner set forth.

38,973.—Railroad Car Truck.—Silas Merrick, New Brighton, Pa.:

I claim the combination of the guides, J L, curved in the arc of a circle, of which the king-bolt forms the center, with the conical friction posts, K, rolling upon a flat surface, and having end-play in their bearings, when constructed, arranged, and operating substantially in the manner described, for the purposes set forth.

38,974.—Sheet-metal Can.—Hermann Miller, New York City:

I claim forming the junction or union between the sides and the top or bottom of a can or other vessel made of sheet-metal by means of the double recessed clamping lap-joint herein described.

38,975.—Stump Extractor.—W. K. Moody, Hartford, Wis.:

I claim, first, The combination of the lever, O, provided with pawl, h, ratchet, L, with chain, M, attached, and the windlass, P, all arranged and placed on a suitable framing to operate as and for the purpose herein shown and described.

Second, The vertically sliding or adjustable bars, D D, having wheels, H, at their lower ends, in combination with the cams, I, said parts being applied to the framing of the machine in the manner as and for the purpose set forth.

[This invention consists in the employment of a windlass, lever, pawl and ratchet, and a chain and hook arranged in such a manner that a good and efficient leverage power is obtained within a limited space. The invention further consists in a novel application of wheels to the framing of the machine, whereby said framing may be readily lowered and adjusted in a working position, and also readily raised so as to be supported by the wheels when the machine is to be moved or transported from place to place.

38,976.—Valve for Steam Hammer.—Robert Morrison, Newcastle-upon-Tyne, Great Britain. Patented in England Dec. 16, 1859:

I claim the use of a valve in steam hammers when so arranged with reference to the parts that both ends of the steam cylinder can be placed in communication with each other at the same time, communication with the boiler being then cut off, the same valve being also so arranged that whenever steam shall be admitted to one end of the cylinder, communication between that end and the other shall be cut off, substantially as described and for the purpose specified.

38,977.—Coffee-roasting Apparatus.—Samuel Nowlan, New York City. Ante-dated Nov. 12, 1862:

I claim, first, The method herein described of collecting the volatile products of coffee and condensing the same, substantially in the manner and for the purpose herein set forth.

Second, Combining with a revolving coffee-roaster of otherwise ordinary construction and operation a serpentine or other suitable condenser, in the manner herein described, so that the vapors or volatilized essential oils shall pass into said condenser, to be collected, as set forth.

38,978.—Sofa Bedstead.—F. C. Payne, New York City:

I claim a sofa bedstead having a fixed or permanent seat, a, and a bed or mattress, C, formed of two parts, f f′, attached to frames, B D, connected to each other by hinges, d, and to the sofa by hinges, e, and arranged to fold within a case or box, d, within the sofa underneath the seat, a, substantially as herein shown and described.

[This invention consists in having the bed or mattress of the sofa distinct or separate from the seat portion, so that the upholstery of the latter will not be injured by the use of the device as a bed, as is the case with the ordinary sofa bedsteads, in which the bed or mattress is connected with and forms a part of the seat. Besides the advantage above mentioned this invention admits of a wider bed or mattress being used than can be obtained with an ordinary sofa bedstead of the same size, and greater facilities are afforded for cleansing the mattress and freeing it from insects when necessary; and the invention further admits of the sofa being constructed in any desired form, as fashion may dictate—an advantage not possessed by the ordinary sofa bedsteads, which require to have flat seats and vertical ends in order to admit of the seat being turned over to form the bed, or a portion of the same.]

38,979.—Corn Planter.—Ezra Peck, Middleport, Ill.:

I claim the arrangement of the working-beam, E′, levers, f, and tappets, g, in combination with rods, e, bell-crank levers, d, and segmental seed-slides, E, all constructed and operating substantially as and for the purpose specified.

[This invention consists in the arrangement of a working-beam actuated by means of tappets projecting from the axle of the driving wheels and acting on oscillating levers, in combination with segmental seed-slides connecting with the working-beam by bell-crank levers and suitable rods, and operating in the hopper in such a manner that by the action of the tappets on the hinged levers and rock-shafts the seed slides are alternately forced up through the seed, acting as stirrers and filling their cells, and then drawn out to discharge the contents of their cells into a furrow drawn by a steel coulter at the bottom of a sled-form standard supporting the front of the frame of the planter.]

38,980.—Connection of Car Trucks.—William Pettit, Philadelphia, Pa.:

I claim arranging the center-pin which connects a car or locomotive to the truck, and on which the truck turns, in a position to the rear of the center of the truck and between the two axles of the same, as set forth for the purpose specified.

38,981.—Drilling Machine.—Charles P. Philippi, Crown Point, Ind.:

I claim the arrangement and combination of the adjustable square screw, Q, with cylinder, N, and drill, M, arranged and operating on the table, A, with the adjustable bed-plate, B, as herein described, for drilling holes in plates of metal.

38,982.—Range.—Samuel Pierce, Troy, N. Y. Antedated April 29, 1863:

I claim the supplying of the fire-chamber, d, at the rear end thereof by means of the reservoir and feeder, a, in combination with the triangle concave fire-brick back, b, and the fire chamber, d, in the manner substantially as herein described and set forth.

38,983.—Skates and their Fastenings.—Charles V. Ramsdell, Bangor, Maine:

I claim the combination of the devices, A B D E F and G, as arranged with the wooden sole of the skate as herein described and for the purposes set forth.

38,984.—Construction of Metallic Boats.—Lewis Raymond, New York City:

I claim a removable skeleton frame for the purpose of building metallic boats, consisting of a combination of ribs, E, clamps, H, stringers, F, and aprons, I, or their equivalents, and constructed substantially as described in such manner that it can be secured to the keel, the stem and stern-post of the boat by screw-bolts or other fastenings, and can be removed therefrom after the removal of these fastenings, substantially as herein set forth.

38,985.—Grain-dryer.—Ransom S. Reynolds, New Haven, Conn.:

I claim the arrangement of the endless moving aprons in their respective chambers, with their inlet and exit passages for the transmission of the grain through them, when said chambers are furnished with heated and cool air, substantially in the manner and for the purposes herein described.

I also claim in combination with the traveling endless belt, W, the series of stirrers consisting of upon hinged arms, for the purposes of allowing them to yield to the depth of grain on said belt, and to continue their rotation as whatever position they may assume, substantially as described.

38,986.—Boot-tree.—A. P. Richardson, Worcester, Mass.:

I claim, first, the combination of the hooked cam, m, with rod, B, and the movable part, D, substantially as set forth.

Second, The combination of catch lever, n, with the foot-piece and rod, B, and movable part, D, substantially as set forth.

38,987.—Making Knitting Needles.—Thomas Sands, Gilford, N. H. Ante-dated June 10, 1863:

First, I claim the combination in their relative order of the straightener, the eye-punch, the traversing platform, the cutting-off apparatus, and the rotary burr for slabbing down the needle.

Second, I claim holding the wire by means of the punch, which remains in the eye, and the simultaneous movement of the traversing platform which carries the wire forward for the subsequent operations.

Third, I claim the concave or grooved burr when used for forming needles in the manner described.

Fourth, I claim the combination of the eccentric, 16, and revolving burr, 30, when so set with reference to each other as to give the required taper to the needle.

Fifth, I claim the combination of the traversing platform 3, the eye-punch, 48, and cutter, 39, operating in conjunction with each other, as described.

Sixth, I claim the combination of the cam, D, and the eye-punch, 48, when by reason of the breadth of this cam the eye-punch is caused to retain its hold of the wire during its traverse towards the cutter, a distance equal to the length of a needle, substantially as herein described.

38,988.—Machine Knitting Needles.—Thomas Sands, Gilford, N. H. Ante-dated Feb. 23, 1863:

I claim a machine knitting needle that is rigid or inflexible at the bend, and flexible either upon the barb or upon the shank, or upon both barb and shank, substantially as herein described.

38,989.—Stove.—Jacob Shavor, Troy, N. Y.:

I claim the combination of the air-tube, E, the chamber, B, in the conical ring or grate, A, communicating with the fire-chamber by means of the apertures, i, and the triangular flues, the whole being arranged and combined in the manner substantially as herein described and set forth.

I also claim the method of securing the said upper and lower sections by means of the rods, D D D D, with the nuts, e e e e, and upper nuts, f f f f, thereon arranged substantially as herein described and set forth.

38,990.—Washing Machine.—Peter Shoudy, Canajoharie, N. Y.:

I claim in combination with the concave circular-shaped wash-box

the oscillating and perforated dashers, b, the inclined boards, d, substantially in the manner and for the purposes herein described.

38,991.—Fire-place.—Edwin A. Skeele, St. Louis, Mo.:
I claim the arrangement of the inclined adjustable damper, C, with reference to the bar, f, plate, d, screw, h, fire-back, A, and frame, B, all being constructed and arranged substantially as herein described for the purposes set forth.

38,992.—Smoke-stack for Locomotives.—Allen S. Sweet, Jr., Detroit, Mich.:
I claim in the stacks of locomotives the employment of the concentric deflector, E, or equivalent contracted casing, arranged over the exhaust nozzle or nozzles, and within any suitable casing or castings of perforated material, so as to operate substantially in the manner and for the purpose herein set forth.
I also claim in the stacks of locomotives the combination and arrangement of an inner perforated stack or strainer with a constructing ring or rings, a narrow annular space, a, and an external stack of the form and character substantially as described; that is to say, I claim the inner stack, D G I, or its equivalent, the contracting ring, E, and the outer chamber, I K L, arranged substantially as described, so as to present a narrower space, a, around the ring, E, than is afforded above, substantially as and for the purpose herein set forth.

38,993.—Paper-drying Machine.—N. W. Taylor and J. W. Brightman, Cleveland, Ohio:
First, We claim the combination of partitions, G, the openings, d, and the adjustable parallels, h, arranged and operating as herein set forth.
Second, We claim in connection with a paper-drying machine the adjustable platform, P, rack and pinion, P', shaft, p, and crank, p', when combined and operating as and for the purpose set forth and described.
Third, We claim the rotating fan, N'', in combination with the chamber, H'', perforated partition, H', and cpamber, L, and steam-pipes, z, all arranged and operated substantially as and for the purpose specified.

38,994.—Concussion Fuse for Shells.—Isaac P. Tice, New York City:
I claim, first, The construction of the tube or plug of a percussion fuse with two separate chambers or compartments, one for containing a fulminate, and the other for containing sand, or other hard granular substance, so arranged and combined by means of a lock that by the impact which is given to the projectile by the firing of the charge of the gun, the said lock may be unlocked to permit communication between the said chambers to permit the admixture of their contents substantially as and for the purpose herein specified.
Second, So constructing and arranging the parts of the above-mentioned lock that, though it shall be unlocked by the concussion produced by firing off the charge of the gun, the chambers containing the fulminate and hard granular substance shall not be allowed to communicate until after the projectile has left the gun, substantially as and for the purpose herein set forth.
Third, The admixture of fulminates used in a percussion fuse with cotton, gun-cotton, wool, sawdust, or other soft material, substantially as and for the purpose herein described.
Fourth, The lining of the sides of the chamber provided in a percussion fuse tube or plug for containing fulminate, with flannel, cloth, or other soft material, and the placing of cushions of soft material at the ends of the said chamber, substantially as and for the purpose herein specified.
Fifth, The employment in the percussion fuse of an explosive projectile of two fulminates, one of which is more sensitive and easily ignited, and the other of which burns more slowly or with a stronger flame as fulminate of mercury, substantially as and for the purpose herein specified.

38,995.—Stirrups.—Wm. H. Towers, New York City. Ante-dated June 18, 1862:
I claim forming the outer side bars, A, of stirrups shorter than the inner ones, B, for the purpose of giving the foot-rests or plates, C, a corresponding inclination downward toward the horse's side, substantially in the manner and for the purpose herein set forth.

38,996.—Snow Plow and Scraper for Railroads.—Edward Trenholm, Washington, D. C.:
I claim the helical springs, G, constructed and employed in the manner described, for the attachment of scrapers of any suitable form to a framing by which they are carried.

38,997.—Knitting Machine Burrs.—Miner Van Auken, Amsterdam, N. Y. Ante-dated Feb. 1, 1863:
I claim the combination in a knitting burr of the hollow stock, A, and stud box, B, with one or more passages through its side, substantially in the manner and for the purpose described.

38,998.—Sugar Pan.—A. T. Wilder, Laporte, Ind.:
I claim the construction of the sections of the pan with lips, e, thereupon, combined and operating together in the manner and for the purpose herein shown and described.
[This invention consists in a pan with a cast-iron bottom made in three parts with off-sets or tips to facilitate the operation of casting and fitting the bottom to the sides, said pan being divided into three compartments, which communicate with each other by means of faucets inserted into the partitions. The invention consists also in the arrangement of ratchet wheels and pawls in combination with two dampers under the pan in such a manner that each damper can be set and retained in any desired position, and that the amount of heat thrown towards the bottom of each compartment of the pan can be regulated at pleasure.]

38,999.—Lamp Burner.—Moses B. Wright, West Meriden, Conn.:
I claim, first, Having the wick wheel-shaft, D, made to vibrate substantially as and for the purpose herein shown and described.
Second, The combination of the wick tubes, B, and wicks, C C, with the plate, b, and the upper part of the jacket, A, substantially in the manner and for the purpose herein shown and described.
[This invention relates to an improved coal-oil burner of that class which are designed to be used without a draft chimney. The invention consists in constructing the burner with two wick-tubes, arranged within a jacket or case in a novel way, and in such relation with a center-piece that a good illuminating flame is obtained without a chimney, and one that will not heat the burner to such a degree as to cause an undue evaporation of the oil in the lamp.]

39,000.—Paint Composition.—E. F. Barnes, New York City, assignor to S. D. Law and E. P. Curtis, Brooklyn, N. Y.:
I claim the article of manufacture or composition of matter, hereinbefore described, composed of crystalline carbonate of lime, carbonate of lead, carbonate of zinc, and oil, mixed or compounded according to the principle and substantially in the proportions specified.

39,001.—Applying Locks to Safe-doors.—J. J. Burnet and William Bellamy (assignors to G. R. Jackson), New York City:
We claim the employment or use, on a safe or other door, of two or more locks, G G', in connection with clamps, H H', and an arm, C, or an equivalent device, so arranged that the bolt frame, B, may be actuated or shoved back in order to unlock the door, by unlocking one lock only, as set forth.

39,002.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim, first, The combination and arrangement of the piles of slides or bits with the bolt and with a brace in or on the lock case, for locking or unlocking the bolt, substantially as herein described and represented.
I also claim, in combination with the pins that hold and release the slides or bits, and with the key-pins, the pins, o, in the door to which the lock is attached, so that the lock can be conveniently attached to the door, and the bits made accessible from the outside, substantially as described.

39,003.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim first, The combination of the escutcheon and cam worked by the bank of the knob or lever, with an interposed series of pins, having necks thereon, and which must be properly arranged by a key before either the escutcheon or cam can be turned to operate the main bolt of the lock, substantially as described.
I also claim, in combination with a cam or its equivalent to operate a lock bolt, a spring bolt, m, arranged inside of and operated inside of the lock, for locking back the main bolt, substantially in the manner and for the purpose described.

39,004.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim the combined use, and in the mode described, of a slide and key, with a pile or series of tumblers, for the purpose of arranging said tumblers to lock or unlock the hasp, substantially in the manner and for the purpose set forth.
I also claim the notched hasp as fitted to and used with a multiple bolt, for greater security, as set forth.
I also claim, in combination with the hasp, the headings, h i, for protecting or burying the hasp, substantially as described.

39,005.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim, first, The combination of the sliding escutcheon and the bolt, with the shank, I, constructed and operating substantially in the manner and for the purpose set forth.
I also claim connecting the escutcheon and the bolt to the shank by means of the slotted arms, g h, so that the escutcheon shall lead the bolt at the first movement of the shank, substantially as and for the purpose described.
I also claim the combination of the box pins and bolt, operating together and supporting each other, substantially in the manner herein described.

39,006.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim the combination and arrangement of the key, hub, bit-plate, and hasp-catch, so as to operate with each, in the manner and for the purpose set forth.

39,007.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, M. Y.:
I claim, in combination with the two bolts and double-bitted key, the hub and bit-plates, arranged, constructed and operating together, substantially in the manner and for the purpose herein described.

39,008.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim combining with two bolts in one and the same lock case—each bolt operated upon by its own key—the bit-plates, F, common to both bolts and both keys, in the manner and for the purpose herein described.

39,009.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim the combination of the key, turning hub, bit-plates, with a shooting bolt, the whole constructed and co-operating together substantially in the manner and for the purpose herein described.

39,010.—Lock.—R. S. Foster, Sing Sing, N. Y., assignor to himself, Cornelius Walsh, Newark, N. J., and John C. Nobles, Rushford, N. Y.:
I claim the combination of the key hub, bit-plates and their openings, with a hinged hasp, and the cheek plates, the whole constructed and operating substantially in the manner and for the purpose herein set forth and described.

39,011.—Safety-guard for Railroad Cars.—Thomas Gillen, assignor to himself, T. M. Coleman and William Wilson, Jr., Philadelphia, Pa.:
I claim the arm, F, and shield, G, constructed and arranged on the car in respect to the wheel, substantially as and for the purpose set forth.

39,012.—Combined Spade, Fork, Hoe and Rake.—Thomas Goodrem, Providence, R. I., assignor to John Barnes, North Providence, R. I.:
I claim, substantially, the within-described combined spade, fork, hoe and rake, as a new article of manufacture.

39,013.—Skate.—Martin Huyzel and Martin Nadig (assignors to D. R. Barton), Rochester, N. Y.:
We claim the combination of the removable heel-spur, clamping screw, S, with the collar, C, and the double posts, p p, the former being cast to the latter, and they being rigidly attached to the runner by brazing, or other equivalent means, all in the manner and for the purposes specified.

39,014.—Harvester.—S. T. Holly (assignor to F. B. Manny), Rockford, Ill.:
I claim, first, Hinging the tongue of a harvesting machine to the reach by trunnions attached to a hub that carries a caster spindle so constructed that the caster is caused to turn with its spindle, substantially in the manner and for the purpose set forth.
Second, The attachment of the reach of the harvesting machine to the tongue by means of a hinged hub and caster spindle when the spindle has a positive axial rotation imparted to it from the right or left movement of the tongue, and turns more rapidly than the tongue, substantially in the manner and for the purpose set forth.
Third, The combination of the segment ring, M, the eccentric ring, e, and the pinion, g, or their mechanical equivalents, substantially in the manner and for the purpose described.

39,015.—Belt Tightener.—J. A. and H. A. House (assignors to themselves and A. G. Seaman), Brooklyn, N. Y.:
We claim the lever, F, constructed substantially as described, for the purpose set forth.
We also claim the combination of the lever, F, with the break, G, substantially in the manner described, for the purpose of stopping the belt when its motion is reversed.

39,016.—Telegraphic Signal.—Pierre Henri Stanislas, Count d'Escayrac de Lauture, Paris, France:
I claim the within-described universal analytic grammar of signals based on the substitution for the alphabetic transcription of words of certain appropriate conventional signals in combination with the separation of the lexical element from the grammatical element, substantially as herein specified.
[This invention consists, principally, in substituting for the alphabetic transcription of words, certain signals, and separating the lexical element, or the words, from the grammatical element—flexions, prepositions, adverbs, &c.—of speech.]

39,017.—Mode of oiling Car-axles and Bearings.—B. D. Stevens, Lawrence, Mass., assignor to himself, S. C. Crombie, Nashua, N. H., and G. S. Appleton, Burlington, Vt.:
I claim the peculiar car-axle oiling device, A B and C, applied as and for the purposes stated.

39,018.—Self-oiling Journal Boxes and Bearings.—B. D. Stevens, Lawrence, Mass., assignor to himself, S. C. Crombie, Nashua, N. H., and G. S. Appleton, Burlington, Vt.:
I claim, first, The combination of the ring, a, with the opening, f and chamber, E, substantially as and for the purposes stated.
Second, The combination with the parts, B C and D, of a ring, a, or its equivalent, upon the journal, substantially as and for the purposes stated.

39,019.—Machinery for making Wooden Cases for Lead Pencils.—Auguste Weiller (assignor to Eberhard Faber), New York City:
I claim, first, The combination of the semicircular cutter, D, and semicircular planer, E, as and for the purpose specified.
Second, The fitting of the semicircular cutter, D, and semicircular planer, E, between the two plates, C C, placed on a mandrel or shaft, A, and provided with semicircular grooves, a a', at their inner sides to receive the sides of the cutter and planer, as herein set forth.
[This invention consists in the employment of a segmental cutter and a segmental planer, fitted between end plates on a suitable mandrel or shaft, and so constructed and arranged that the grooves may be cut in a strip or slat of wood to receive the leads, and the surface of said strip or slab planed in a proper manner to receive the covering which is glued to the strip or slab over the lead.]

39,020.—Composition for Paint.—Paul Caubet, Paris, France:
I claim the improved composition for painting composed of two compounds or preparations, one a liquid, and the other siccative compound, to be combined in the proportion and the manner substantially as hereinbefore described.

39,021.—Bran-duster.—Matthias Smith, Rochester, N. Y.:
I claim producing a downward current and centrifugal atmospheric pressure within the gauze cylinder, O', of bran-dusters, by means of spiral wings, W, in combination with a ventilator, o, the parts being arranged and operating substantially in the manner and for the purposes set forth.

39,022.—Cooking Stove.—P. P. Stewart, Troy, N. Y.:
First, I claim the separate and independent air chamber, W X O & P, each separately communicating with the ash chamber, Q, and having perforated sides, I E G and H, communicating with the fire chamber, M, in combination with the ash chamber, Q, the whole being arranged and combined in the manner substantially as herein described and set forth.
Second, I also claim the ribs or upward projections, B B, having apertures at or near the top thereof, in combination with the oven, R, with the apertures, T', in the front doors, Y, and with the fire chamber, M, in the manner substantially herein described and set forth.
Third, I also claim the hollow walls or chambers, h h, extending the entire length of the oven and just below the bottom plate thereof and at the outer edge of said oven, in combination with the broad and inclined sheet flue, A', in the manner substantially herein described and set forth.
Fourth, I also claim the corrugated oven plate, A, in combination with the ribs or upward projections, B B, with apertures therein, and with the oven, R, in the manner substantially herein described and set forth.

39,023.—Churn.—Andrew Walker, Claremont, N. H.:
I claim, first, Placing the disks in the churn, as described, for the purpose of providing a receptacle for the cream above them and inside of the churn, thereby dispensing with the receptacle usually employed outside of the churn for feeding the cream to the disks.
Second, The disk, b, as constructed, when arranged to rest on the shoulders of the churn, as and for the purpose set forth.
Third, The set screw, s, in combination with the stationary disk, b, all arranged and operating in the manner and for the purpose set forth.

## RE-ISSUES.

1,501.—Sugar-draining Apparatus.—Gustavus Finken, New York City. Patented Nov. 11, 1856:
I claim, first, The employment—for the purposes of carrying sugar molds to the cooler or cistern from which they are filled, of containing them while being filled, and of transporting the filled molds to a convenient place for draining—of a wheel carriage constructed with suitable seats and means of holding several molds in an upright position, substantially as herein described, whereby I effect the saving of labor herein explained.
Second, Furnishing such a carriage as is hereinabove specified with movable mold-stoppers applied to be operated by means of one or more levers, or their equivalent, outside of the carriage, substantially as and for the purpose herein specified.
Third, Providing in such a carriage as is hereinbefore specified, a vacuum chamber for the connection of an air pump or its equivalent, substantially as and for the purpose herein specified.

1,502.—Grain Separator.—C. B. Hutchings, Rochester, N. Y. Patented November 20, 1860:
I claim the tubes, T, and T'', screens, S'', and division, D, or their mechanical equivalents, when constructed, arranged and operated substantially in the manner and for the purposes specified.
Second, The relative arrangement of the screens, S'', the blank surface of one being opposite the perforated section of the one next above it, as specified, so as to catch the kernels of oats or other similar grain, which may pass through the upper screen and strike the blank surface of the next, endwise, and cause them to fall to a horizontal position, and thereby pass over the perforated section of this screen, and be discharged at the side of the machine, while the wheat kernels, being short, pass through the perforations, as and for the purpose described.

1,503.—Apparatus for teaching the Art of Swimming.—Socrates Scholfield, Norwich, Conn. Patented May 12, 1863:
I claim the combination of a float with a suitable apparatus to prevent the entrance of water while breathing, the whole being constructed to operate substantially in the manner described.
I also claim a mouth-piece, D, arranged with the pipes, a and b b', to be applied directly to the mouth and nostrils, substantially as specified.

## DESIGNS.

1,789 to 1,791.—Plates for Cooking Stoves (three cases).—J. F. Rathbone, Albany, N. Y.

## EXTENSION.

Pressure Gage.—Eugene Bourdon, Paris, France. Patented June 18, 1849:
I claim the application of curved or twisted tubes whose traverse section differs from a circular form, for the construction of instruments for measuring, indicating and regulating the pressure and temperature of fluids, substantially as above described.


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## PATENTS FOR SEVENTEEN YEARS.

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THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like inven-

tion has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** down to **$15**. Other changes in the fees are also made as follows —

| | |
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| On filing each Caveat | $10 |
| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Re-issue | $30 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design, three and a half years | $10 |
| On filing application for Design, seven years | $15 |
| On filing application for design, fourteen years | $30 |

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases o designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records a the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

# Notes and Queries

J. W. S., of Vt.—The number of signals made by the telegraph in a given time does not depend upon the power of the battery, as the velocity of the current is always much greater than the action of the key. The increase of battery power is employed to send messages to greater distances by overcoming the resistances. The cause of your siphon becoming inoperative in conveying the water from your well to the barn-yard must be owing to air getting into the tube. If it has run well for three hours, as you say it has, it should run freely for a week, if kept in proper order.

W. B. G., of N. Y.—As you suggest, the efficacy of a rifle does not depend upon its length of barrel. You will find this subject discussed on page 50 of "Chapman's American Rifle." He asserts that with one of Wesson's 12-inch pistols he can beat at any distance any 4-feet barelled Western hunting rifle ever made and used on the old system.

G. E. S., of Pa.—You should be very careful not to permit any of the tanning liquor from your vats to enter the steam boiler of your engine, as the gallic acid in the tanning liquor has a strong affinity for iron, and will injure your boiler. Some of this acid may be vaporized with the steam, and this may account for the rapid wearing of your throttle and slide valves. But it is a common thing for the seats of the slide-valves of engines devoted to any kind of work to cut and wear in grooves. If the valve is kept in proper order—running true upon its seat and well lubricated—it will not cut in the manner that yours has been affected.

T. R., of Conn.—Goods composed of cotton warp and woolen filling can be colored by one continuous operation, but not with one dip. The wool is dyed first, then the cotton. The cotton of warp rags intended for shoddy may be destroyed by boiling them in strong sour sulphuric acid and water. The acid attacks the vegetable fiber with avidity, but its action is moderate upon wool. Wash the rags well afterwards.

A. B. C., of Iowa.—You state that there is a wheel under a 4-feet head and 100 inches of inlet water which drives a 4-foot circular saw. We think you must be mistaken, as the actual power of the fall and the quantity of water is only about three and a quarter horse-power. A 4-foot saw should have a water-power of four horses, and we would prefer one of greater power. Any of the turbine wheels illustrated in recent volumes of the SCIENTIFIC AMERICAN will answer your purpose, if you have a steady supply of water.

M. A. S., of Iowa.—What do you mean by a "small galvanic battery?" You can obtain batteries in this city ranging from one dollar up to forty dollars in price.

H. H., of Ohio.—A good stiff paste of wheat flour is employed for putting maps upon cloth backing. The varnish used by map-mounters in this city is all purchased from manufacturers of varnish.

O. V. F., of Ohio.—If you have had the saw-frame improvement in use six years you could not now come forward and claim a patent for it. The Commissioner of Patents would decide that you had abandoned your invention to the public. It is unfortunate that you cannot raise the means to patent your useful inventions.

M. C., of Maine.—When a patent is owned jointly by two persons, one of the owners can manufacture and sell the article without obtaining the consent of the other. Both parties are at liberty to do the same. In this respect a patent right is the same as any other property.

H. S., of C. W.—We cannot now give you the names of porcelain manufacturers in this country. The business is carried on to a limited extent only; all fine articles of porcelain are imported. Pearl-glass and porcelain have been used for piano keys, but are inferior to ivory, we believe.

J. R., of Minn.—If you make an improvement upon a patented invention you would have to take out a separate patent for it. Under the patent law amendment of 1861 the granting of patents for additional improvements was abolished. All such improvements are now treated the same as original inventions.

## Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, June 24, to Wednesday, July 1, 1863:—

T. and W., of N. Y., $39; G. B. F., of Ill., $20; J. W. C., of Ky., $45; S. L. F., of Mass., $20; E. O. B., of N. Y., $16; J. and S., of Wis., $20; K. and S., of N. Y., $16; S. F., of N. Y., $15; T. B., of N. Y., $18; H. W. C., of Vt., $22; D. F., of Ill., $28; R. F., of Ind., $7; E. E., of N. Y., $28; E. F. C., of Nebraska, $25; D. R. W., of Iowa, $25; F. J. U., of Vt., $25; S. L. G., of N. Y., $16; J. W., of Mich., $45; J. H., of Ill., $16; H. F. B., of Ill., $16; G. C., of N. J., $25; G. F. J., of Iowa, $20; F. J. Z., of N. Y., $25; O. A., of N. Y., $16; W. M., of Mass., $36; G. W. C., of Ill., $20; J. H., of Pa., $20; M. B. D., of Pa., $41; J. R. L., of N. Y., $20; W. H. T., of Cal., the field, on ships, &c. Address C. C. ALDRICH, Morristown, $75; D. G. M., of N. Y., $22; J. H. B., of N. Y., $16; J. S., of N. Y., $44; E. W., Jr., of Vt., $25; A. J. A., of Ill., $16; P. L., of Cal., $25; C. B., of Iowa, $16; W. D. H., of La., $16; T. F., of N. Y., $25: S. T. S., of Mass., $50; J. T., of Wis., $16; S. J. A., of Cal., $15; T. J. W., of N. H., $16; E. D. B., of N. Y., $16; T. F. B., of N. Y., $25; W. H. H., of N. Y., $25; T. J. B., of Ohio, $25; J. L., of N. Y., $25; G. C., of N. Y., $20; A. F., of N. Y., 22; H. G. H., of Ind., $45; J. P., of N. Y., $20; J. A. A., of Conn., $20; G. C. E., of N. Y., $20; G. D. C., of N. Y., $41; E. B., of Cal., 20; E. H., of N. Y., $30; J. H. McM., of Ind., $15; J. V. D. and Son, of Va., $15; J. W. T., of Vt. $25; A. H. A., of Ind., $10; J. H. C., of Va., $20; R. H. W., of Wis., $25; J. E., of N. Y., $50; C. W. T., of Mich., $29; M. F. W., of Ill., $15; I. A. P., of Ill. $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, June 24, to Wednesday, July 1, 1863:—

D. G. M., of N. Y.; G. De C., of N. Y.; J. S., of N. Y.; J. A., of N. Y.; W. H. H., of N. Y.; F. J. Z., of N. Y.; J. L., of N. Y.; T. & W., of N. Y.; W. M., of Mass.; A. F., of N. Y.; J. W. C., of Ky.; M. B. D., of Pa.; R. F., of Ind.; D. F., of Ill.; E. W. Jr., of Vt.; J. W. T., of Vt.; J. V. D. & Son, of Va.; E. F. C., of Nebraska; E. E., of N. Y.; D. R. W., of Iowa; A. J. A., of Ill.; F. J. U., of Vt.; H. B. W., of Wis.; T. F., of N. Y.; J. H. C., of Va.; F. F. B., of N. Y.; T. J. B., of Ohio; J. E., of N. Y.; G. C., of N. J.; S. T. S., of Mass. (2 cases); L. N. P., of Ind.; J. H., of Mass.; W. F., of Iowa; C. W. T., of Mich.; I. A. P., of Ill.; T. R. C., of Iowa; J. N. W., of Ill.; J. F. M., of Paris, France.


## RATES OF ADVERTISING.

**Twenty-five Cents** per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

FAIR OF THE AMERICAN INSTITUTE, 1863.—The Board of Managers of the American Institute hereby give notice that they have rented

THE ACADEMY OF MUSIC,

In Fourteenth street and Irving place, for the month of September, in which to hold this

GREAT NATIONAL EXHIBITION.

The exhibition will be general, embracing MANUFACTURES of all kinds, NEW INVENTIONS, IMPROVEMENTS IN AGRICULTURAL IMPLEMENTS and the MECHANIC ARTS generally, excepting only machinery propelled by steam-power. Premiums, consisting of Gold, Silver, and Bronze Medals, and Diplomas, will be awarded on the decision of competent and impartial judges. Articles for competition for the premiums will be received commencing August 28, 1863, and the Fair will be opened to the public on

WEDNESDAY, SEPTEMBER 2.

Circulars giving full particulars can be had at the rooms of the Institute in the Cooper Union Building.

By order of the Managers,
WM. H. BUTLER, Chairman.
WM. S. CARPENTER, Vice-Chairman.
JOHN W. CHAMBERS, Secretary. 2 3eow

NOSES! NOSES!! NOSES!!!—PHYSIOGNOMY—Illustrated—Noses of the Races—Caucasian, Anglo-Saxon—Ethiopian, Arab—Jew—Greek—Roman, Celestial, etc., including Noses of every size, shape, and character. What is the significance of each? The Straight, Aquiline, Flat, Snub, and Turn-up Noses. The Excentive, Irritable, Defensive, and Aggressive Noses. The Stupid, Tasteful, and Intellectual Nose, with portraits of Prof. Morton, Julius Cæsar, Virgil, Lucretius, Dante's Beatrice, Theodosius the Great, the Emperor Paul, Oliver Cromwell, Gardner, Alex. Wilson, Blucher, Otho the Great, Jean Paul Richter, and others. The most complete treatise on the Nose yet published. See PHRENOLOGICAL JOURNAL for July, 15 cents. FOWLER & WELLS.

GAS FROM KEROSENE TAR AND HARD WOOD.

ALBANY, N. Y., June 26, 1863.

MESSRS. MUNN & CO.:

Gentlemen:—The following extract is from a report of the Superintendent of the Gas-light Company at Whitehall, N. Y., using the Aubin Gas works:—"By the new method we obtain 1,000 feet of gas from 140 pounds of maple wood and 2½ gallons of tar, and the charcoal left is excellent, and actually worth what the wood cost. The gas is rich, and is made much faster and with less heat than before, thus saving both retorts and fuel. We find also that with wood we can use the thick tar formerly thrown away."

Premising that the new method consists in cutting hard wood into small pieces, drying and saturating them with kerosene tar, and then distilling them by the Aubin process, which compels all the vapor to pass rapidly over the red-hot bottom and sides of the retort, I invite the attention of parties needing gas-works to the above statement, adding that the experience of many years is now embodied in the construction and operation of the Aubin works, and the gas made at less cost than by any other system. Many village works in successful operation can be referred to.

Very truly yours, H. T. HAWLEY.

1

SOUL AND BODY.—MAN'S RELIGIOUS NATURE—How God acts on the Soul—Degrees of Talent—Religious Faculties—Dormant Powers—Children not Alike: Why? How far are we Accountable? Fatalism Examined—How to Serve God—Oratory, Poetry, Genius—A Scientific Analysis of Man's Religious Duties, by a Distinguished Clergyman, in July number PHRENOLOGICAL JOURNAL, 15 cents, or $1 50 a year.

1 FOWLER & WELLS, New York.

A VALUABLE PATENT RIGHT OF A SELF-REGULATOR for controlling the supply of water to steam-boilers for sale by GEORGE L. CANNON, 37 Nassau street, New York. 1*

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LORD BROUGHAM, DR. E. H. DIXON, STONEWALL Jackson, and Anna E. Dickinson, with Portraits, Biographies, and Phrenological Developments, given in July number PHRENOLOGICAL JOURNAL. 15 cents a number. 1

FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 1

HELP YOUR COUNTRY!—WANTED, A CAPITALIST to patent and introduce into service a self-loading cannon. Loads itself; can be fired twenty times a minute; will not heat; can be worked with a number of men; it is simple; can be used in Minn. 1*

TO ENGINEERS AND STUDENTS IN THE PHYSICAL Sciences—Spheroidal matter made to assume new phases, and to illustrate in a most beautiful manner the laws of heat and light. The Spheroidal Heater, with engraved circular, sent per post on receipt of fifty cents. Address JAS. D. HALL, P. O. Box 2,406, New York. See page 24, Vol. IX, SCIENTIFIC AMERICAN. 1*

HUMAN TEMPERAMENT.—HISTORY, DEFINITIONS, and Testimonies—Sanguine, Phlegmatic, Choleric—Melancholic, Bilious, Nervous, Vital, Motive, and Mental. The Physiology of Man—Digestion, Breathing—The Eye—Voice. Of what Man is Made. How to Take his Measure—and Man's Destiny. Marriages, Births, and Deaths. Interesting facts in July PHRENOLOGICAL JOURNAL, 15 cents, or $1 50 a year.

1 FOWLER & WELLS, New York.

WANTED—SCRAP IRON, OLD BOILERS, AND OLD Iron Machinery.—The subscribers will pay cash for any quantity of Wrought or Cast Scrap Iron, Old Boilers, and Old Iron Machinery, delivered at their warehouse, 28, 30, and 32 Terrace street Buffalo, or at their Rolling Mill and Nail Factory, Black Rock, N. Y. Buffalo, July, 1863. PRATT & CO.

-2 10*

## A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861.—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

### ENROLLMENT.

OFFICE OF THE A. A. PROVOST-MARSHAL-GENERAL, SOUTHERN DIVISION OF NEW YORK, NEW YORK, June 23, 1863.

Notice is hereby given to all persons whose names have been ENROLLED in Districts other than those in which they reside, that by calling upon the Provost-Marshal in the District in which they have their residence, they can obtain a CERTIFICATE of the fact of their enrollment in such District, which, upon presentation, will entitle them to have their names taken from the lists, where they may have been enrolled elsewhere.

By adopting this course the Provost-Marshals will be enabled to perfect their lists and prevent the possibility of names appearing more than once in the enrollment.

Application should be made to the Provost-Marshals, as follows:—

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2d Congressional District, No. 26 Grand street, Williamsburgh.
3d Congressional District, No. 259 Washington street, Brooklyn.
4th Congressional District, No. 271 Broadway.
5th Congressional District, No. 428 Grand street.
6th Congressional District, No. 185 Sixth avenue.
7th Congressional District, No. 63 Third avenue.
8th Congressional District, No. 1,184½ Broadway.
9th Congressional District, No. 677 Third avenue.

Col. ROBERT NUGENT, A. A. Provost-Marshal-General. 1 2*

TO MANUFACTURERS AND MACHINE BUILDERS.—The undersigned being engaged in the purchase and sale of machinery, such as steam engines, mill and factory machinery, lathes, tools, and all kinds of manufactured machines and implements, and assisting commission merchants and others in their purchases, solicits from manufacturers their circulars, price lists, terms, &c., also any illustrations of their machinery or works they may have. Parties introducing new inventions or improvements will find it to their interest to communicate with him, giving such information in regard to their improvements as they deem necessary, which will receive the attention due to their merits. J. E. STEVENSON, Machinery Broker, 200 Broadway, New York. References:—The Novelty Iron Works, New York; Franklin Townsend, Albany, N.Y.; Lowell Machine Shop, Lowell, Mass.; Hunsworth, Eakins & Naylor, People's Works, Philadelphia, Pa. 1 5*

WOODWORTH PLANERS—IRON FRAMES TO PLANE 18 to 24 inches wide, at $90 to $110. For sale by S. C. HILLS, No. 12 Platt-street, New York. (1a

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$40 PER MONTH AND EXPENSES. FOR PARTICULARS address (with stamp) HARRIS BROTHERS, Boston, Mass. 23 tf

PAYE'S PATENT FORGE HAMMER—ADAPTED TO both heavy and light forgings, with an adjustable stroke of from one inch to three feet, on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 1 13

LANE'S PATENT LIFTING JACK—VERY EASILY operated, compact, simple and cheap. For cut and description see page 405, Vol. VIII. (new series), SCIENTIFIC AMERICAN. State rights for sale. Communications in relation to rights or orders for Jacks may be addressed to J. G. LANE, Washington, N. Y. 1 8

FOR SALE.—$3,000 WILL BUY A VERY IMPORTant Patent. Address F. W. GROTE, care of W. W. Bosch, No. 20 Gansevoort street, New York. 1 2*

PATENT GRINDSTONE TURNING MACHINES FOR machine shops. For rights and full-size drawings address the inventor, JAMES THIERRY, Detroit, Mich. 1 3*

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PROVOST MARSHAL GENERAL'S OFFICE, WASHINGTON, May 22, 1863.

NOTICE—THE ATTENTION OF ALL OFFICERS, who have been honorably discharged on account of wounds or disability, and who desire re-enter the service in the Invalid Corps, is called to the provisions of General Orders, No. 105, of 1863, from the War Department, published in the papers throughout the country. Such officers are requested to comply promptly with the provisions of that order, and to send their written applications, as therein provided, for positions in the Invalid Corps (stating the character of their disability), with as little delay as possible, to the Acting Assistant Provost Marshal General of the State in which they may be. Such Acting Assistant Provost Marshal General will at once forward the applications, with his indorsement, to the Provost Marshal General at Washington.

Officers for the Invalid Corps will be appointed immediately upon furnishing the papers required by General Orders, No. 105, of 1863, from the War Department. Their pay and emoluments will commence from date of acceptance of such appointments, and not from date of organization of the respective commands to which they may be assigned.

J. B. FRY, Provost Marshal General. 24 4

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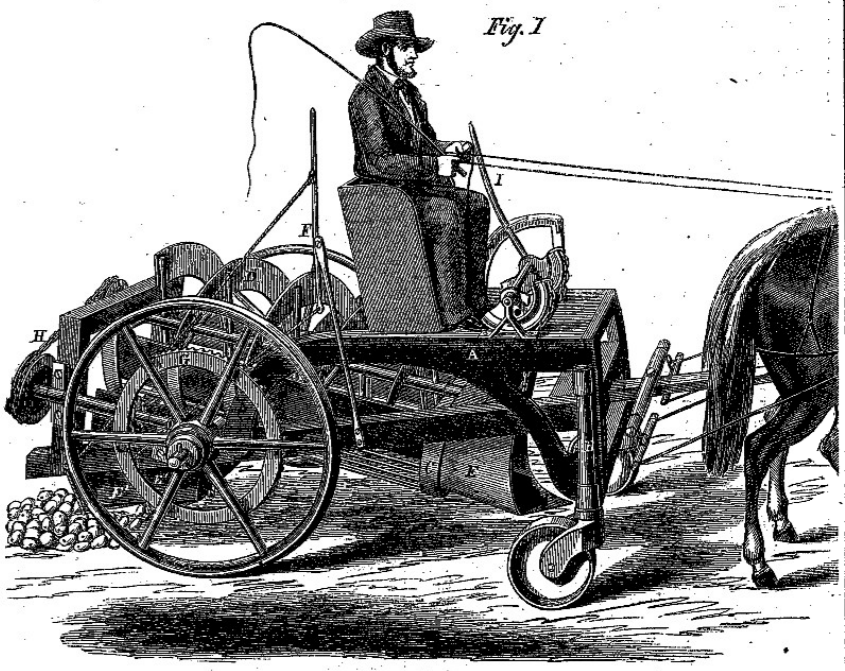
### Improved Potato-digger.

The machine herewith illustrated is remarkably ingenious in the arrangement of its parts, and would seem well adapted to the uses for which it is designed. It is one of a class we have long desired to see introduced to, and operated by, the agricultural community, not alone for the relief it promises from a duty which is arduous and disagreeable, but by the obvious advantages it possesses over the old-fashioned way of grabbing up potatoes with a hoe. It ought certainly to be carefully examined by every person whose interests are connected with farming, and if found practical, as we are confident it will be in most situations, adopted without further delay. The inventor has not so designed the machine, but we do not see why it could not be well adapted to clearing fields of small loose stones which are an intolerable nuisance, especially in lands devoted to grass. If it can be adapted to this use, and we think it can, the machine has a wide range of usefulness, and will go far toward reducing the toil of the farmer. Labor is scarce and costly at the present time, and those who have large crops of potatoes to harvest would do well to give this machine careful consideration. Subjoined is a brief description of the working parts of this potato-digger.

*Fig. 1*

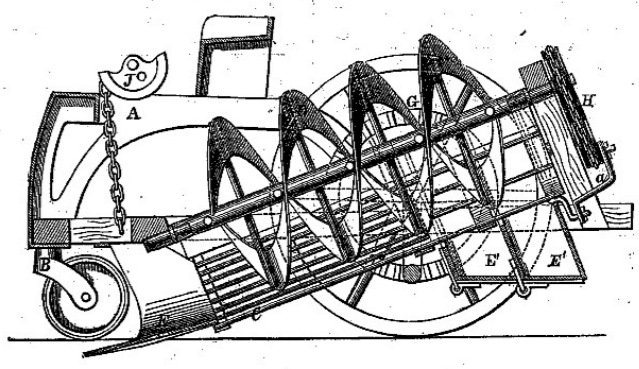



CONOVER'S POTATO-DIGGER.

Fig. 1 is a perspective view and Fig 2 is a section through the length of the machine. The frame, A, of the machine is mounted on the axle-tree, as usual, and has two short arms, B, with castor rollers upon them, so that the whole apparatus can be readily turned in any direction. The axles of each wheel are independent, being bolted to the main frame. The space between the frame is occupied by a vibrating sifter, C. In this sifter a shaft revolves having a scroll or screw-blade, D, winding around its axis. This blade is supported at proper intervals by arms on the shaft. These are the main features of the machine. The operation of it is as follows:—

When the team is started, the pointed shovel or double mold-board plow, E, at the forward part of the machine, enters the rows of potatoes and scoops them up, dirt and all. The potatoes are then carried up into the sifter by the forward motion of the team; the screw-blade then acts upon them and thoroughly screens or sifts them, so that none of the soil adheres. The same device also carries the potatoes back into the separators, through which the smaller potatoes fall, while the larger ones are carried on and deposited in another box, from which they can be discharged as required without stopping the horses. Weeds, grass and stones, are ejected at the extreme end of the machine. The boxes, E', into which the potatoes fall, have loose bottoms which are regulated by the lever, F, on the side of the frame. The vibrating motion of the sifter is obtained from the large wheel, on the arms of which is secured a bevel gear, G. This wheel has a pinion gearing into it, which is fastened on a shaft; this drives the sifter through the agency of a connecting rod, *a*, and the rag wheel and chain, H (see Fig. 2). The depth at which the shovel enters the potato-hills can be regulated by the handle, I, near the driver. In connection with the rack and the chains and sectors, J, any desired depth can be obtained and the shovel raised or lowered as deemed necessary to clear obstructions. This machine is the result of much thought and experiment by the inventor. Two patents have already been issued on this machine, and another, embodying important improvements, is now pending through the Scientific American Patent Agency; further information respecting it can be had by addressing the patentee, Mr. S. B. Conover, at 260 Washington Market, foot of Fulton street, New York.

*Fig. 2*

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THE simplest and best way of preserving woolens through the summer from the destruction of moths, is to wrap them well up, after brushing and beating them, in cotton or linen cloths. The moth can pass neither. Two covers well wrapped around and secured from the air will be effectual.

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